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An account of a comprehensive cervical cytological survey in a general practice, and a review of the state of cervical screening in the area in which the practice is situated.

E. Rose

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PREFACE

An earlier interest in the subject of exfoliative cytology in the detection of cervical cancer was revived when cervical cytology became available to general practitioners in the catchment area of Dumfries and Galloway Royal Infirmary in 1964. The advantages of well-staffed and well-equipped practice premises and a closeknit relatively immobile practice population prompted a challenge to discover how acceptable this service would be to patients and to determine how near we could approach complete coverage of the eligible women in the practice.

The advice and enthusiasm of Dr. A. L. Scott, Consultant Pathologist and the late Dr. J. Bruce Dewar, Senior Consultant Gynaecologist at Dumfries and Galloway Royal Infirmary helped enormously in the application of this service to the practice. All the Practice team, medical, nursing and lay staff played a most important part in informing patients about cervical screening and encouraging them to avail themselves of the service; the resulting high level of recruitment is directly attributable to these efforts. One is grateful to the patients for co-operating so whole-heartedly in this screening programme and it is gratifying to record the ease with which they have come to regard regular cervical screening as part of routine medical care. The early receipt of results of smear examinations and the prompt admission to Hospital of patients who are found to require further investigation are appreciated. Many people have helped me in connection with the preparation of this Thesis. Dr.

A. L. Scott has given valuable advice and information from the Pathology Department of Dumfries Royal Infirmary and has supplied the illustrations of cervical smears. Dr. George Gordon, Gynaecologist at the same Hospital gave me wise and helpful advice on the gynaecological aspects of the text. Miss Hammond, Librarian to the Royal College of General Practitioners has furnished me with photocopies of the many articles studied in the course of preparation of this work. Without her services this task would not have been possible. I am grateful also for permission to use the Central Medical Library of the University of Edinburgh. The staff of the Medical Statistics Department of the Western Regional Hospital Board and the Research and Intelligence Unit of the Scottish Home and Health Department have provided the statistical detail relating to cervical cytology in this area and Scotland as a whole. The statistics on population and morality were obtained from the offices of the Registrar General in Edinburgh and Population Censuses and Surveys, Somerset House, London. Mr. Nicol, Statistician to the Scottish General Practitioner Support Unit in the Department of General Practice, University of Dundee has given helpful advice on statistical aspects and appears to have been undeterred by my lack of knowledge of his subject. The Medical Officers of Health of Dumfries, Kirkcudbright and Wigtownshire have supplied me with details of cervical screening in these areas. Dr. E. M. F. Mann has provided valuable information from the Cytological Service in Aberdeen and Dr. C. Frain Bell kindly sent me most helpful details from the Cytological service in Dundee. I am indeed

grateful to all these people. The services of the calculating machine belonging to Galloway Executive Council has greatly facilitated the preparation of numerical data. A brief account of the six years' experience of cervical cytological screening in my Practice was published in Update in January, 1972 and the figure in the text showing the extent of cervical screening in the practice is reproduced from that article.

The Clinic,

Dalbeattie.

March, 1972.

SUMMARY

A discussion of aspects of screening in cervical cancer comprises the first part of this Thesis. A final elucidation of the natural history of cervical cancer is awaited so that the present controversy over the relationship between carcinoma-in-situ and invasive cervical cancer can be resolved. Factors affecting the application of cervical cytological screening to a population are reviewed and particular attention is paid to the role of the general practitioner in this field, both in general practice and in the Community. The need for greater educational effort to allay fear of cancer and inform the public of the greatly enhanced likelihood of cure if the disease is detected at an early, or better still, a pre-invasive stage is demonstrated.

In the second part of the Thesis, the organisation of a comprehensive cervical cytological survey in the author's General Practice is described, the results discussed and a comparison made with other surveys already reported. The survey is extended to include a review of the state of cervical screening in the catchment area of the Pathology Laboratory of Dumfries and Galloway, Royal Infirmary, the area in which the author's general practice is situated and the performance compared with the practice of cervical screening in other areas.

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PART I

CHAPTER I

SCREENING IN MEDICAL CARE

Early disease detection is a long and well-established part of medical care. Examples are the routine and regular examinations carried out during pregnancy and of the infant and child. With the decline in importance of the communicable diseases as killers in developed countries, attention has become focussed on diseases or conditions associated with high mortality and/or morbidity e.g. Cancer, Ischaemic heart disease, Diabetes Mellitus and Phenylketonuria. In the past, most of the work in connection with early disease detection was carried out by Public Health authorities but, with the increasing interest of general practitioners in this field, a considerable amount of early disease detection is now organised and conducted in general practice. Important factors in this development are the general improvement in practice premises, the attachment of Health Visitors and Nurses and the employment of ancillary staff.

DEFINITIONS

"Screening" was defined by the U.S. Commission on Chronic Illness in 1951 as "the presumptive identification of unrecognised disease or defect by the application of tests, examinations or other procedures which can be applied readily". The definition adopted by McKeown et al. (1968) - "Medical investigation which does not

arise from a patient's advice for specific complaints" - illustrates the difference between the conventional consultation which is almost always initiated by the patient and screening in which the doctor or colleague is generally the prime mover. Where screening is applied as a direct contribution to the health of the individual, the term "prescriptive screening" is used. "Case-finding" in screening denotes that the objective is to detect patients with illness and to bring them to treatment (Wilson 1965). Screening may involve whole population groups - mass screening - or be restricted to high-risk groups - selective screening.

TABLE I

Mortality Statistics from Office of Population, Censuses and Surveys, London. General Register Office, Edinburgh.

Female Deaths from Cancer at All Ages - England & Wales, 1969.
Scotland, 1969.

	England & Wales	% of Total	Scotland	% of Total	Total	% of Total
Total Deaths from Cancer	52,747		5,794		58,541	
Deaths from:						
Cancer of Cervix	2,417	4.58	248	4.28	2,665	4.55
Cancer of Body of Uterus	1,281	2.43	119	2.05	1,400	2.39
Cancer of Ovary	3,518	6.67	353	6.09	3,871	6.61
Cancer of Breast	10,622	19.19	1,101	19.00	11,723	19.12

TABLE II**Deaths from Cancer for Females UNDER 50 years of Age, 1969.**

	England & Wales	% of Total	Scotland	% of Total	Total	% of Total
Total Deaths from Cancer	5,822		642		6,464	
Deaths from:						
Cancer of Cervix	534	9.17	51	7.94	585	9.05
Cancer of Body of Uterus	65	1.12	8	1.25	73	1.13
Cancer of Ovary	512	8.79	48	7.48	560	8.66
Cancer of Breast	1,657	28.46	176	27.41	1,833	28.36

It may be applied to the detection of a single disease or a combination of two or more conditions - multiple or multiphasic screening. Where screening procedures are repeated at intervals of time, the term "surveillance" is often used.

THE CASE FOR SCREENING IN CERVICAL CANCER

Screening as a method of detecting pre-symptomatic or pre-clinical disease demands knowledge of the condition sought, the investigations and treatment available and an assessment of the commitment to patient, doctor and State. The case for screening in cervical cancer will therefore be considered under the headings of the 10 "Principles" put forward by Wilson and Jungner (1968).

1. **The condition sought should be an important health problem.**

The object is to detect cervical cancer at a pre-clinical stage and is based on the assumption that the lesions detected, if

left untreated, would progress to clinical cancer. It is estimated that one woman in every 70 is destined to develop cervical cancer and one in every 100 will die from the disease. (Registrar General, 1958). Jordan (1969) states that approximately 5,000 women in England and Wales are diagnosed annually as having cervical cancer and 2,500 women die from it or, as Stallworthy and Bourne (1971) express so effectively, a patient dies from the disease every $2\frac{1}{2}$ hours. The mortality statistics for England, Wales and Scotland for 1969 depicted in Table I show the total deaths in females from cancer in that year and those for the various forms of genital cancer including breast cancer. The deaths in respect of women under 50 years of age are shown in Table II. It is seen that, although cervical cancer is responsible for just under 5% of all deaths from cancer, it is responsible for 9% of all deaths from cancer in women under 50 years of age.

TABLE III

Cancer Incidence by Site in Female. From American Cancer Society Report, 1966 quoted in Corscaden's Gynecologic Cancer, 4th ed., 1970.

Skin	11%
Mouth	2%
Respiratory	4%
Breast	23%
Digestive	22%
Urinary	3%
Genital	21%
Leukoplakia and Lymphomas	6%
All Other	8%

TABLE IV

Probability of Developing Cancer from Birth onwards for
Leading Sites in the Female. (New York State, 1949-1951).
(Reproduced from Corscaden's Gynecologic Cancer, 4th ed., 1970).

SITE	PROBABILITY %
All Sites	24.99
Breast	5.54
Intestines	2.69
Skin	2.51
Cervix Uteri	2.32
Fundus Uteri	1.60
Stomach	1.35
Lung and Bronchus	0.37

The incidence of cancer by site in the female in the U.S.A. and the probability of developing cancer from birth onwards for leading sites in the female in New York State are shown in Tables III and IV. It is observed in Table III that genital cancer (vulva, vagina, cervix and body of uterus) is one of the three most important sites. From the figures in Table IV, Gusberg and Frick (1970) observe that, sooner or later, one in four females in New York State will develop cancer in some organ and that one in twenty-five will develop cancer of the uterus (unspecified). If cancer of the ovary and vulva is added, the risk rises to one in twenty and to one in ten if cancer of the breast is included.

While these statistics are convincing in themselves, the effect of the illness on the patient and her family is immeasurable. In many instances the woman is at the height of her parental and domestic responsibilities. To observe the impact on a household and family of a mother of young children dying is probably one of the most harrowing experiences in general practice. Nor does one

forget the suffering and unpleasantness of the advanced stages of the disease and the associated mental anguish. It is observed from the mortality figures for all ages in Table I that breast cancer is responsible for four times more deaths in one year than cervical cancer, and that cancer of the ovary also causes more deaths. However, cervical cancer possesses several distinct advantages so far as early detection is concerned. The cervix is easily accessible, the tumour exfoliates; exfoliative cytology is an accurate and acceptable screening procedure and there is a long pre-invasive stage. The natural history of carcinoma-in-situ is fully discussed later but the concept that this is a pre-invasive lesion is assumed when describing these advantages.

It is indeed unfortunate that, as yet, no diagnostic procedures suitable for screening for breast cancer are generally available. Those in use are considered to be insufficiently reliable or to require resources which are not generally available. Furthermore, the value of early treatment has not been established (McKeown et al. 1968). This is not to say that routine palpation of the breasts (with the addition of mammography in some centres) is worthless but the concept is different in that it is aimed at detecting clinical cancer at an earlier stage than if screening was not carried out. Inaccessibility and absence of symptoms are the main reasons for the delay in detecting ovarian cancer. Although the primary aim is to detect cervical cancer in the in-situ phase, the detection of an unsuspected lesion which has progressed beyond this phase is of great importance

as the patient's chance of survival depends so much on the stage at which treatment is carried out. Rhodes (1971) quotes the approximate 5-year survival rates for all forms of treatment as follows:

STAGE 0	98%
(Carcinoma-in-situ)	
STAGE I	70%
STAGE II	50%
STAGE III	30%
STAGE IV	10%

It is appreciated that a negative smear may be obtained from an invasive lesion where the surface may be relatively acellular hence the importance of visualising and assessing the cervix clinically. The detection and subsequent treatment of non-malignant conditions such as polypi, Trichomonal and Monilial infections is another benefit of screening.

2. There should be an accepted treatment for patients with recognised disease.

Many authorities recommend total hysterectomy with removal of a vaginal cuff as first choice in treatment of cervical carcinoma-in-situ. Conservative treatment consisting of conisation of the cervix with follow-up is reserved for those cases where childbearing is still important and in pregnancy when the conisation may be delayed, if considered necessary until after delivery. In some centres conservative treatment is recommended in cases found at follow-up to have no clinical or cytological evidence of pathology in the residual cervix. McLaren (1967) reports the results of a

series of cases managed conservatively between 1952 and 1965.

Conisation with annual follow-up served adequately for both diagnosis and treatment in all but 14 out of 141 patients with carcinoma-in-situ or marked basal-cell dysplasia. The duration of follow-up extended from 1 to 14 years and in that time there had been a 10% loss to follow-up. Possible after-effects of conisation on childbearing may be a tendency to abortion, premature delivery and complication at delivery due to cervical stenosis. Boyes et al., (1970) consider that, for patients with in-situ lesions, the risk of developing further disease is less after hysterectomy than after conisation but that the difference is not large enough to justify hysterectomy as initial therapy for all patients.

Some advantages claimed for conservative treatment are:

- (i) "Unnecessary" hysterectomy is avoided. This applies to those cases which show no residual lesion in the removed uterus.
- (ii) The inevitable consequence of sterility is avoided.
- (iii) The fact that hysterectomy is not necessarily a consequence of the detection of carcinoma-in-situ could be reassuring to some women when recommending routine screening to them.
- (iv) General acceptance of conservative treatment would reduce the total length of stay in hospital by combining diagnosis and treatment in one procedure. There would be a resultant lowering of costs and social difficulties would be less than with the two-stage procedure of diagnostic biopsy and hysterectomy after 6 weeks or so.

Coppleson and Reid (1971) list some of the possible risks of conservative treatment as follows:

- (i) Probable incomplete removal of the lesion. The incidence varies from 16 to 45% in reported series. Nearly all the persistent lesions are found at hysterectomy to be in the endocervical canal. Green (1966) an advocate of conservative treatment, suggests that residual lesions high up in the endocervix are in no danger of spreading, presumably because of some factor associated with their location.
- (ii) Recurrence of carcinoma-in-situ in the vaginal vault. Isaacs and O'Connor (1965) found evidence of 20 such cases. It is for this reason that removal of a vaginal cuff is recommended at the time of hysterectomy. It is argued that these areas of carcinoma-in-situ at the vaginal vault may have been present at the time of hysterectomy.
- (iii) Risk of trapping malignant cells. This is considered to be more a theoretical than actual risk.
- (iv) Increased predisposition to cancer. It has been suggested (Gray, 1964) that women who have already developed carcinoma-in-situ are more likely to develop the condition again. Reports of the results, so far, of follow-up of patients treated conservatively have not confirmed this. Default from follow-up, which in some instances might have to be life-long, is obviously a very real risk. Also, some women might find the lingering doubt,

emphasised by the insistence on close follow-up, psychologically unacceptable. Two such cases are reported by McLaren (1967).

It is evident that until the natural history of cervical carcinoma-in-situ is completely understood, the choice of treatment depends largely on those in charge of the case.

3. Facilities for diagnosis and treatment should be available.

It would be essential to ensure that laboratory and clinical facilities were available before embarking on a screening programme. The extent of the facilities would dictate the range of women to whom screening would be offered e.g. married women of 35 years and over or an unrestricted service. The close cooperation of the gynaecologists is vital in dealing with the patients who require investigation. Early admission to hospital and settling of the doubt whether or not further operation is required is most reassuring for a woman who is, naturally, often very upset on hearing of an abnormal smear report.

4. There should be a recognised latent or early recognisable stage.

This will be discussed under "Natural history of the disease".

5. There should be a suitable test or examination.

The use of exfoliative cytology is an established, accurate and practicable method of screening for carcinoma-in-situ. A full description of the method will be given later. Other tests which are being investigated include:

Estimation of enzymes in vaginal secretion.

Trials have been carried out to examine the value of estimating the 6-phosphogluconate-dehydrogenase (6. PGD) level in vaginal aspirate as an index of the presence of malignant cells. Although there appears to be almost 100% detection of invasive cancer, the results in carcinoma-in-situ are less reliable. Cameron and Husain (1965) reported a false negative rate of 50% and a false positive rate between 20 and 40%. At present, it is considered that the test is too unreliable on its own to be used as a screening procedure for pre-invasive cancer.

Cell counter with a size distribution plotter.

This approach is based on an observation of Ladinsky et al. (1964) that a secondary peak of concentration of cells of larger volume is demonstrable in the vaginal secretion of patients with malignant disease. However, Husain and Cameron (1966) observed a high incidence of false positives and negatives and considered the test impracticable at present.

Other techniques involving automated and computerised scanning of cells are being examined. Ultra-violet light, laser beams or phosphors are being employed in these tests. None of these is, as yet, available for routine use.

6. The test should be acceptable to the public.

As in all screening programmes, it is often those women most at risk who are least willing to submit themselves to having a cervical smear taken. However, it does not seem to be the nature

of the test which deters these women but disinterest in the concept of screening. It will be shown later that a high rate of acceptability can be achieved. The use of the self-collection pipette is one way of increasing acceptability.

7. The natural history of the condition, including development from latent to declared disease, should be adequately understood.

Screening campaigns for the detection of carcinoma-in-situ of the cervix are based on the assumption that the condition sought is a precursor of invasive cancer. As a result of the detection and treatment of the in-situ lesion, it is hoped that invasive cancer can largely be prevented. It is known that the in-situ lesion can and indeed does progress to invasive cancer but is this always so?

Dunn (1953) poses three fundamental questions concerning the relationship between carcinoma-in-situ and invasive cervical cancer and its application to screening:

- (i) What percentage, if not all, of carcinomas-in-situ of cervix are destined to become invasive?
- (ii) What percentage, if not all, of invasive carcinomas begin as carcinoma-in-situ?
- (iii) What is the average duration of carcinoma-in-situ and how much time variation is there around this mean duration?

Evidence for and against progress of in-situ lesions of the uterine cervix to invasive cancer is produced from histological studies and from observations from mass screening programmes but, as Anderson (1959) states, "the problem of whether carcinoma-in-situ

goes on to invasion or not is incapable of solution because diagnosis is always treatment". Younge, (1965) quoted the observation of Stewart that "every infiltrative cancer of the cervix must come from an in-situ cancer there being no other thing it can come from, this irrespective of doubts cast on the relationship".

Histological evidence

Cases have been reported of in-situ lesions which, for one reason or another, were not treated definitively being observed over a period of years and found to become invasive. Kottmeier (1956) estimated that 31% of in-situ lesions progressed to invasive cancer while Koss (1963) concluded from a study of 70 cases that one-quarter became invasive, one-quarter remained stationary while the remainder regressed. Anderson (1959) however, doubts whether regression ever occurs and suggests that the lesion has been removed in these instances of alleged regression. Paterson's (1952) well-known report of a series of carcinoma-in-situ which were not radically excised and of which 35% progressed to invasive cancer over a period of 14 years is criticised by Knox (1968) on three counts; (i) The nature of the lesion may have been altered by the biopsy, (ii) The in-situ lesion was demonstrable only in the limited amount of tissue removed at biopsy and the lesion may have been invasive elsewhere and (iii) The cases were from women with symptoms and not directly comparable therefore, with those without symptoms.

Evidence from large scale surveys.

If carcinoma-in-situ is the natural precursor of invasive

cancer, the detection and treatment of in-situ lesions should be reflected by a fall in the incidence and mortality from the disease. Observations from the mass screening programme which commenced in British Columbia in 1955 indicate that the incidence of invasive cancer is falling. Bryans et al., (1964) report a drop in incidence from 28.4 cases per 100,000 of the population to 15.5 per 100,000 in 1962. Green (1965) points out however, that there has been a world-wide fall in the incidence of invasive cervical cancer in recent years and that this cannot be entirely due to screening and removal of incipient lesions. It is interesting to note that a study of the clinically invasive cancers detected in British Columbia in 1962 showed an incidence of only 3.5 per 100,000 among the 40% of the population screened prior to 1962 and an incidence of 24.1 per 100,000 among the "unscreened". So far, there has been no significant decline in the mortality from the disease. The British Columbia workers argue that it is still too soon to expect this. Doll, quoted by Husain (1968) believes however, that some 20% reduction should have occurred by 1965 in British Columbia but factors such as self-selection, a trend towards greater accuracy in certification in cause of death and, as mentioned above, already-present invasive cancer may mitigate against such a reduction. Christopherson (1971) reports a fall in mortality from cervical cancer in Jefferson County, Kentucky, from 23.7 per 100,000 of the population in 1953 to 10.8 per 100,000 in 1967. A long-term screening programme commenced in the County in 1956 and it is

claimed that this reduction is the result of screening as the rate has not fallen in the rest of the State where screening has been only sporadic. It is also noted that the incidence rate for squamous cervical cancer in women under 50 years has fallen by 43.2% and for all ages by 38%

TABLE V

Mean age of patients at various phases in the development of squamous cell carcinoma of the cervix.
(Ref. Bryans, Boyes and Fidler, 1964, Amer. J. Obstet. Gynaec. 88, 901, British Columbia).

	Age (yr.)	No. of Patients
* Age at onset in cases with previous negative smears	37.7	49
In-situ cases	42.3	1,051
In-situ cases with microinvasive foci cases	46.2	73
Microscopically invasive cases	50.4	53
Clinically invasive cases	52.1	569
* Value calculated from a group of 49 women who were known to have had previous negative cytology and who subsequently went on to develop carcinoma-in-situ.		

TABLE VI

Average age of patients at various phases of carcinoma of the cervix at the time of diagnosis.
(Ref. Macgregor, J.E., 1966, Acta Cytologica, 10, 247, Aberdeen).

Average age of 166 pre-invasive carcinoma	36.27 years
Average age of 61 invasive carcinoma	44.41 years
Average age of 374 clinical carcinoma	53.0 years

Macgregor et al. , (1971) report the findings of the first 10 years of their screening programme in Aberdeen where 97.3% of women under 60 years of age have been smeared at least once. In 1968 and 1969, eight and nine years after the commencement of screening, 30 cases of clinical cancer were detected and of these, 22 had not been previously screened. The percentage of cases found in stages I and II had risen from 62% in 1951-1954 to 82% in 1966-1969. The five-year survival rate for all stages in 1942-1947 was 26.9% compared with 38% (52% when stage Ia cases are included) in 1961-1964. It is suggested that this improvement, which is noted in each stage group, can be attributed either to better treatment or to the effect of earlier diagnosis and treatment.

Duration of pre-invasive stage.

Varied estimates of the likelihood and duration of progression of in-situ lesions to invasive cancer are reported from the mass surveys. Boyes et al. , (1962) suggest that approximately 60% develop into invasive cancer over a period of 13 to 20 years depending on methods of calculation. Graham et al. (1962) believe that only 10 to 20% progress to become invasive if untreated. Macgregor, (1967) found that the highest incidence of positive smears was in women 10 to 19 years after first coitus and the highest incidence of clinical cancer 20 to 39 years after marriage. Likewise the difference in average ages of the women with in-situ lesions and those with invasive lesions suggests a chronological relationship. The mean ages of the patients in the various categories of cervical cancer in the British Columbia and Aberdeen surveys are shown in

Tables V and VI.

Dunn (1966) concludes from his analysis of the large scale Memphis and San Diego projects and data from the British Columbia survey that invasive cervical cancer sometimes begins as a dysplasia in young women and that this dysplasia may either regress or go on to carcinoma-in-situ. He states that the greater proportion appears to begin as carcinoma-in-situ with a long pre-invasive period of around 10 years and that those at greatest risk are between 25 and 29 years of age. A smaller proportion begins as a lesion that becomes rapidly invasive. He considers that invasive lesions from all origins require about four years to become symptomatic and clinically apparent.

It is evident that the method of observing the effect of screening requires a long time before any statistical appraisal can be made. Ashley (1966) therefore, approached the investigation of the natural history of carcinoma-in-situ of the cervix by analysing the data already available on the incidence, prevalence and mortality rates for invasive and pre-invasive cervical cancer. The age-specific prevalence rates of carcinoma-in-situ from 7 large surveys, covering in all over 500,000 women, were calculated. It was noted that there was a steep rise to a maximum prevalence between the ages of 35 and 40 years followed by a steady fall. The fall in prevalence of carcinoma-in-situ after the age of 40 years is a feature peculiar to this type of tumour. The age-specific incidence rate for invasive cervical cancer in 10 regions of the United States

in 1955 showed a steady rise from low values in the younger age group to a maximum between the ages of 50 and 60 years followed by a fall in incidence after that age. Ashley suggests that this pattern of incidence may be due to reduction of cervical stimulation and irritation and possibly the effect of the post-menopausal fall in the level of circulation sex hormones. He then calculated the expected prevalence of carcinoma-in-situ from the incidence of invasive cancer and demonstrated certain differences between the two conditions. Supposing that approximately one-third of in-situ lesions progress to invasive cancer and that the period of progression was 5, 10, 15 or 20 years, Ashley found that in all these calculations there was a deficit of cases of in-situ carcinoma; this deficiency is particularly marked in the case of the older woman between 50 and 55 years in whom the prevalence of in-situ cancer is falling while the incidence of invasive cancer is climbing to its maximum. From the analysis, Ashley suggests that there may be two biologically different forms of cervical cancer; a slow-growing variant, susceptible to therapy, which may be preceded by carcinoma-in-situ and a rapidly-growing type, more resistant to treatment, which occurs in later life than the slow-growing type and is not preceded by carcinoma-in-situ. If this is so, then the hope that mass screening would eliminate invasive cervical cancer by virtue of detecting and treating in-situ lesions will not be fully realised. Pedersen (1966) draws much the same conclusions from his analysis of the preliminary data from a screening campaign in Norway. He suggests that mass screening

tends to favour the detection of the relatively benign varieties of tumours; if their completed observation confirms the impression, then there would be some justification for the claim that present periodic mass screenings for cervical cancer "attract the wrong people and detect the wrong cases".

In his evaluation of screening in cervical cancer, Knox (1968) states that the main problem in elucidating the natural history of non-invasive lesions is that they cannot be diagnosed to be non-invasive until after they have been completely removed. This precludes any attempt to observe their progress. He further states that the inferences from population studies are possible provided that incidence, prevalence and error rate are measured simultaneously. He criticises the majority of surveys so far reported in that they are prevalence studies taken at a national point in time and without large-scale attempts to link sequential observations in the same women. In order to elucidate the natural history, incidence, prevalence and error rates, Knox (1966) proposes a scheme whereby 100,000 women should be enrolled and re-examined to a total of three occasions with a planned variation of intervals between examinations. This would mean about 400,000 examinations spread over a period of approximately five years.

A hypothesis concerning the origin of cervical cancer put forward by Reid and Coppleson (1971) contains much of the evidence already discussed as well as introducing some original and possibly controversial observations. Two points are elaborated briefly before

quoting the hypothesis - (i) Squamous metaplasia is considered to be a physiological process whereby the simple columnar epithelium is replaced by squamous epithelium. The physiological process is most active at three periods viz. late foetal and neonatal stage, early adolescence and first pregnancy. The areas most affected are those most exposed to the vaginal environment - the summits of rugae, the tips of villi and the ring of epithelium adjoining the "native" or original squamous epithelium. The transition from columnar to squamous epithelium is irreversible so that the trend in time is an increase in squamous epithelium. Reid and Coppleson state "the insidious origin of atypical metaplasia during the physiological process introduces a field of neoplastic potential wherein exist the precursors of squamous cancer". They believe that dysplasia and carcinoma-in-situ never arise directly from native epithelium but from the uterine side of the line marking the original squamo-columnar junction. (ii) Reid and Coppleson state that the uptake of environmental material into the cell nucleus of the metaplastic cell whereby "foreign" DNA encounters "host" DNA constitutes a mutagenic process. Two possible sources of extraneous DNA are considered - a) Viral: the virus of genital Herpes, HSV₂, has been incriminated but, as yet, there is no positive evidence that this virus is capable of genetic transformation and b) Spermatzoal: large quantities of DNA are present in the vagina and cervix at each act of intercourse. It has been demonstrated that immature metaplastic cells phagocytosed human sperm, both in vitro and in vivo, whereas native squamous and columnar epithelium did not.

Reid and Coppleson's Hypothesis concerning the origin of cervical cancer:

"A hypothesis which fits all the presently known facts incriminates an infectious substance, possibly a nucleo-protein transmitted at coitus, which finds its way to presumptive epithelial cells during the process of metaplasia. This process is especially marked at adolescence and at the first pregnancy which, accordingly, become periods of high predisposition. There follows a genetic transformation causing some aberration in protein synthesis. This could take two forms (i) An aberration in the normal protein produced, such as Keratin and (ii) The production of a variant protein in the nature of a mitotic trigger or other growth controller which may divert protein production towards abnormal reproduction and to initiate a neoplasm. Since the outcome of the transformation is not viewed as necessarily neoplastic, we refer to such an agent as a mutagen rather than a carcinogen".

On the subject of dysplasia, Younge (1965) mentioned several generalisations which had been made about dysplasia viz. age incidence, its frequent association with carcinoma-in-situ and invasive cancer, its incidence as a routine finding in hysterectomy specimens and its reported rate of regression, progression or persistence. He quotes Fluhmann who concluded that "on the basis of the above generalisations, it seems justified to accept dysplasia as a lesion which bears a relationship to carcinoma-in-situ very similar to that of carcinoma-in-situ to invasive cancer. The co-existence of these

lesions and the fact that dysplasia, at least in some cases, progresses to pre-invasive cancer is good evidence that it should be considered representing potential neoplastic fields". Stern and Neely (1964) conducted a follow-up study on a group of women initially diagnosed as having dysplasia of the cervix. They found an incidence rate for in-situ cancer among patients with dysplasia of 64 per 1,000 per year compared with a rate of 0.04 per 1,000 per year in women without dysplasia. It was observed that there was a significantly higher rate of progression from dysplasia to cancer observed in women under 45 years of age than in women 45 years and over.

8. There should be an agreed policy on whom to treat as patients.

Any women who is found to have an abnormal smear requires to be followed up and thus becomes a patient.

9. The cost of case-finding (including diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care as a whole.

Estimates of the cost of case-finding in screening in cervical cancer show considerable variation. Knox (1968) quotes a sum of between £300 and £800 to detect each case of carcinoma-in-situ. Macgregor and Baird (1963) calculated the cost per case in a general practice survey to be £59 - approximately the same cost as detecting a case of pulmonary tuberculosis by mass radiography. - this figure, however, does not include the cost of diagnosis and treatment. Factors affecting the cost of cervical screening include the source of the smear collection, the frequency of repeat screening and the

response of the high-risk groups of women. Husain (1968) analysed the cost of smear-collection from different sources. He found that the cost per person attending a Public Health Clinic worked out about £1.50. This included the cost of running the clinic and advertising etc. The general practitioner received 37½p for smears taken from women aged 35 years and over when payment was introduced in 1967. This fee was raised to 75p in 1968 and to 95p in 1970. No fee is payable for a smear repeated within five years. In a screening programme where smears are taken from women of all ages and repeated every two to three years a large proportion of smears attract no payment. The materials are supplied free from the pathology laboratory. The cost of smear collection within the hospital was around 25p. The cost of smear examination was estimated to be about 50p per smear. This was based on a workload of 5,000 smears per screener per year. Based on a four-yearly incidence of pre-cancerous conditions of 2 per mille, the total cost of smear-taking and biopsy is estimated at around £2,000,000; this was considered a conservative estimate in 1968 so will be greater now. If it is assumed that approximately one-third of cases of carcinoma-in-situ would progress to invasive cancer if left untreated, about 1,400 cases of invasive cancer per year would be prevented in the long run. This would be expected to save about £500,000 which could be set against the total for screening. It is calculated that, if early treatment succeeds in curing 1,400 cases of whom some 60% would otherwise have died, the cost to the N.H.S. per life saved

would be around £2,000 (N. P. H. T. 1968). It is realised that the cost of treating already-present disease plus the cost of screening will increase the total expenditure for some years after the introduction of screening.

It is evident that screening is a costly exercise but if, as it is hoped, the occurrence of invasive cancer is eradicated or, at least, significantly reduced, this cost will be amply justified.

10. Case-finding should be a continuous process and not a "once-for-all project."

The publicity and attendant excitement of a screening "Drive" or "Fair" attracts a large number of people but, very rarely, those most at risk. Furthermore, the campaign can only detect prevalent disease and, unless those attending can be convinced of the necessity for regular and follow-up screening, a false sense of security may result. The subsequent screening of women attending a "single-occasion" clinic could present difficulties in that arrangements would have to be made for this to be carried out by their general practitioner or at a Well-Woman Clinic. One would anticipate a poor response to follow-up if it was left to the women herself to arrange this. The general practitioner is in the ideal and unique position of being, potentially, in continuing contact with his patients. For this reason, he can play a large and important part in advising participation in screening procedures and in the follow-up of those screened, irrespective of whether he carries out the screening himself or not.

"NO WOMAN NEED DIE OF CANCER OF THE CERVIX"

(Christopherson, 1971)

Fighting words but is the claim justified and, if so, is this the result of cytological screening?

The study of principles of case-finding applied to screening in cervical cancer shows that all the conditions are fulfilled with one crucial exception - the lack of complete understanding of the natural history of cervical cancer. This lack of knowledge affects, in turn, the calculation of cost-benefit of screening in this disease and leads to controversy over the treatment that should be carried out for in-situ lesions of the cervix.

The claim made by Christopherson and others that invasive cervical cancer can be eliminated as a result of comprehensive cytological screening can only be justified if the nature of cervical cancer is such that all invasive lesions progress from in-situ ones: this presupposes that all in-situ lesions can be detected by exfoliative cytology and that the concept of regular screening should be accepted by all women "at risk" - a pious hope rather than a practical reality I feel!

Other advocates of cervical screening more modestly claim that the incidence of invasive cancer can be significantly reduced by the detection and treatment of in-situ lesions but admit that some cases of cervical cancer may have a very brief, or possibly non-existent, in-situ phase and thus preclude any attempt at detection while in a pre-invasive state. The steady fall in incidence of invasive cancer observed in British Columbia and parts of the U. S. A. where mass

screening has been carried out for several years is considered to be a reflection of the effectiveness of cervical cytological screening; the evidence produced from a study of cases of invasive cancer which occurred in British Columbia in 1962 is particularly impressive; this study showed that the incidence among the "screened" population was 3.5 per 100,000 compared with an incidence of 24.1 per 100,000 in the "unscreened". The results from the first ten years of comprehensive screening in Aberdeen strengthen the case in favour of screening. Macgregor and her colleagues, (1971) show that, although cervical cancer has not been eradicated, increasing numbers of cases of microinvasive cancer have been detected as screening proceeds and they claim that the detection and treatment of at least some of these lesions has prevented presentation at a later date as clinical cancers. Clinical cancers have been discovered at pelvic examination and brought to treatment at an earlier stage with a consequent improvement in prognosis. There has been a "striking increase" in five year survival rate. The five-year survival rate for all stages has risen from 29 per cent in 1942-47 to 62 per cent in 1961-64 for women under 50 years of age and from 25 per cent to 46 per cent in women over 50 years of age. It is also observed that the number of women under 60 years of age with the disease has fallen and it is hoped that before long the women in the population over 60 will consist of those who passed through the screening process and their lesions will have been detected and treated at the pre-clinical stage.

The optimism so far expressed on the effectiveness of screening in cervical cancer is challenged by Green (1970). As a result of

his observations on patients with invasive and in-situ cervical cancer in Auckland, New Zealand, he draws the following conclusions:

1. The fall in the incidence of invasive cervical cancer has not been accelerated by cytology screening.
2. Invasive cervical cancer mortality has not been influenced by cytology screening.
3. Five-year survival rates have not been influenced by cytology screening.
4. Hysterectomy is an unnecessarily radical operation for dealing with cervical cancer-in-situ.
5. Providing invasive cancer is adequately excluded at the outset the patient with diagnosed in-situ cancer has only the normal chance of developing invasive cancer in the future.
6. The only way to settle the question as to what happens to carcinoma - in-situ is to follow adequately-diagnosed but untreated lesions indefinitely. Green admits that this is a theoretical impossibility because diagnosis is always treatment to an indeterminate degree.

He then describes an attempt which is being made in Auckland where two series of women drawn from those who have had an initial histological diagnosis of carcinoma-in-situ established by a punch-biopsy of a colposcopically significant area on the cervix and another group of 5 women who have had a hysterectomy (four for cervical carcinoma-in-situ) and who now have histologically proven vaginal carcinoma-in-situ are being followed without "treatment" by clinical, colposcopic and cytological examinations.

In an earlier evaluation of cervical screening Green, (1966) lays stress on two uncertain factors in the natural history of cervical cancer -- the length of the pre-invasive phase and the proportion that go on to invasion. He claims that clinical evidence is tending to show, but cannot prove, that the latter is small - probably much less than 10 per cent and that present mortality rate evidence appears to be showing that the length of the pre-invasive phase must be much longer than the time cytology screening has been in use, for there is not any evidence that 14 years of experience of screening in British Columbia or 10 years in New Zealand has had any beneficial effect on the respective mortality rates. He concludes by stating that if the present trends towards a longer pre-invasive phase and a smaller proportion becoming invasive persist, then the significance of carcinoma-in-situ and the value of cytology screening in the elimination of invasive cancer both become very doubtful indeed.

Thus we are left with three very different sets of opinions on the value of screening in cervical cancer. Perhaps one can sum up the present position where an element of doubt has crept in to temper initial unqualified enthusiasm for screening with a quotation from Goethe - "We know accurately only when we know little; with knowledge, doubt increases". The need for acquisition of further evidence has been recommended by Knox, (1968) who concedes that "There seems to be no reason to interfere with present cervical screening provided that this is not allowed to interfere with the acquisition of the evidence necessary for the evaluation and development of the method". In a similar vein, Younge, (1965) makes the plea that "Cytological

differentiation between minor and major atypia should be our goal, so that the life history of pre-malignant lesions can be studied and unnecessary major diagnostic procedures because of suspicious smears avoided".

Green will not arouse controversy when he quotes the aphorism that "Nowhere is the field for clinical research more fertile than in some concept that is accepted without question". It is to be hoped that research into the natural history of cervical cancer will provide the incontrovertible evidence required for a proper evaluation of screening in this disease.

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EXFOLIATIVE CYTOLOGY IN THE DETECTION OF CARCINOMA OF THE CERVIX

The publication of the classic monograph "Diagnosis of Uterine Cancer by the Vaginal Smear" by Papanicolaou and Traut in 1943 focussed attention on the potentiality of this technique in detecting pre-symptomatic cancer of the cervix. Since then, exfoliative cytology has become an integral part of any gynaecological examination and is also used on its own as a screening method. The success of the test depends on the accessibility of the cervix and the exfoliating properties of the lesion being sought. It is noted that a negative smear may be obtained from an invasive cervical cancer since, with sloughing of necrotic tissue, the surface may be acellular or the malignant cells obscured by degenerating ones.

Four methods of Cell Collection are described:

1. Ayre's spatula scrape method.

A specially designed knuckle-ended wooden spatula is used and a circumferential scrape of the cervix carried out so that the cells are collected from the squamo-columnar junction. In this method the cervix must be visualised, therefore, a speculum and source of lights are required.

2. Aspiration of mucus-containing exfoliated cells from the posterior fornix of the vagina by pipette.

This is the method used by Papanicolaou. It has the advantage that a speculum is not required but, as will be mentioned later, the interpretation of the aspirate is complicated by the profusion of

cells. It is sometimes successful in detecting cells exfoliated from an adenocarcinoma of the uterine body.

3. Aspiration of the endocervical canal and endometrial cavity.

This method aims to detect endocervical lesions and adenocarcinoma of the uterine body but it is not, at present, in general use in screening programmes in Great Britain. It is used in conjunction with the first two methods in some centres, particularly in the U.S.A.

4. "Do it yourself" method.

A plastic irrigation pipette devised by Davis in Baltimore is inserted into the vagina and material collected by irrigation with preservative fluid contained in the pipette. The filled pipette is then sent to the laboratory

The cells obtained from the first three methods are spread on glass slides and immediately fixed by an alcohol-based fluid or spray fixative. In the Davis pipette method, the aspirate is centrifuged before fixing. The cells are stained with that described by Papanicolaou. Although the interpretation of smears is carried out by trained cytologists, it is interesting to recognise the appearance of normal and abnormal cells. A brief account of the cellular structure and appearance, taken from Wachtel's "Exfoliative Cytology in Gynaecological Practices" is now given.

The normal stratified squamous epithelium of the vagina and ectocervix consists of four distinct layers:

1. Basal, or reserve cell, layer composed of a single layer of

small round cells which are firmly attached to the basement membrane. They are responsible for cell regeneration and do not exfoliate.

2. Parabasal layer. The parabasal cells are polyhedral cells with relatively large nuclei and cellular processes reaching from one cell to the next; when exfoliated, they appear as round or oval cells, their bridges having been lost.

3. Intermediate layer. This lies above the parabasal layer. It is usually composed of several rows of slightly larger flatter cells with intercellular bridges. Their nuclei are vesicular and smaller in relation to cell size than the parabasal cells. When exfoliated, these intermediate cells appear larger and less rounded than the parabasal ones; those from lower zones stain bluish-green whereas those from the upper zone stain pink.

4. Superficial layer. This is composed of several layers of large flat cells with pyknotic nuclei. In smears these are large and polyhedral with a clear transparent cytoplasm and pyknotic nuclei. They usually stain pink.

Normal smears contain not more than two types of squamous cells i.e. those exfoliated from the topmost layer and that immediately underneath.

Endocervical cells are obtained from the squamo-columnar junction, the lining epithelium of the endocervical canal and the endocervical glands. These cells are cylindrical in shape, about four times the size of lymphocytes, and have a flattened upper pole

bearing cilia and a rounded lower pole containing the relatively large nuclei. When large numbers of endocervical cells have exfoliated, they may appear in clusters or palisade formation. The inner ciliated borders of the cells form a straight line and the nuclei, lying towards the base of the cell, form a second parallel line.

Endometrial cells, which are obtained by aspiration of the endometrial cavity or may be exfoliated into the posterior fornix aspirate, may be of glandular or stromal origin. The stroma cells are small round cells with a relatively large concentric nucleus. Endometrial glandular cells are a little larger and resemble endocervical cells.

Other constituents of smears are:

Mucus.

Micro-organisms: Doderlein Bacilli where Glycogen is present.

Trichomonas Vaginalis

Candida Albicans.

Derived from Blood: Leucocytes, Erythrocytes and Fibrin.

" " Connective tissue: Small and giant Histiocytes.

Spermatazoa.

Well-recognised variations of the normal smear pattern occur in many non-malignant conditions. Examples of these are ante- and post-natal smears, those taken from women on oral contraception and in the presence of Trichomonal infection.

Smear pattern in malignant disease

Malignant or pre-malignant changes in the epithelium may

be recognised in smears by the presence of atypical epithelial cells of either squamous or columnar epithelial origin. Ninety-five per cent of carcinomata of the cervix are of the squamous type and the remainder are adenocarcinomata. Distinguishing features of cells of malignant tumours are their tendency to proliferate in an uncontrolled manner and their tendency to spread into other parts of the body, firstly by local infiltration and later by dissemination through the lymphatics and blood vessels. Another important property of malignant tissue is that it exfoliates at a greater rate than normal tissue.

Nuclear characteristics in malignant disease:

1. Gross enlargement of the nucleus without corresponding enlargement of the cell body. The nucleus occupies at least one-third of the cell volume, thus upsetting the nuclear/cytoplasmic ratio.
2. Irregular nuclear outline. Variation in shape and size. May be lobulated.
3. Irregular chromatin distribution. Chromatin clusters of varying shapes and sizes giving rise to a rough irregular appearance.

Additional features which MAY be present:

4. Hyperchromasia, due to their increased chromatin content.
5. Multinucleation.
6. Enlargement and multiplication of nucleoli.

Dyskaryosis

In smears from women with a dysplastic lesion, cells are

found which have normal mature cytoplasm but with abnormal nuclei; such cells have been named "dyskaryotic". They may also be found in severe inflammatory conditions, notably Trichomonal infections and in smears from women on oral contraception.

Classification of Smears:

Papanicolaou classified smears into five categories:

Negative smears Class I Smears contain only normal cells.

Class II Smears contain abnormal but definitely benign cells. All inflammatory cell patterns fall into this category.

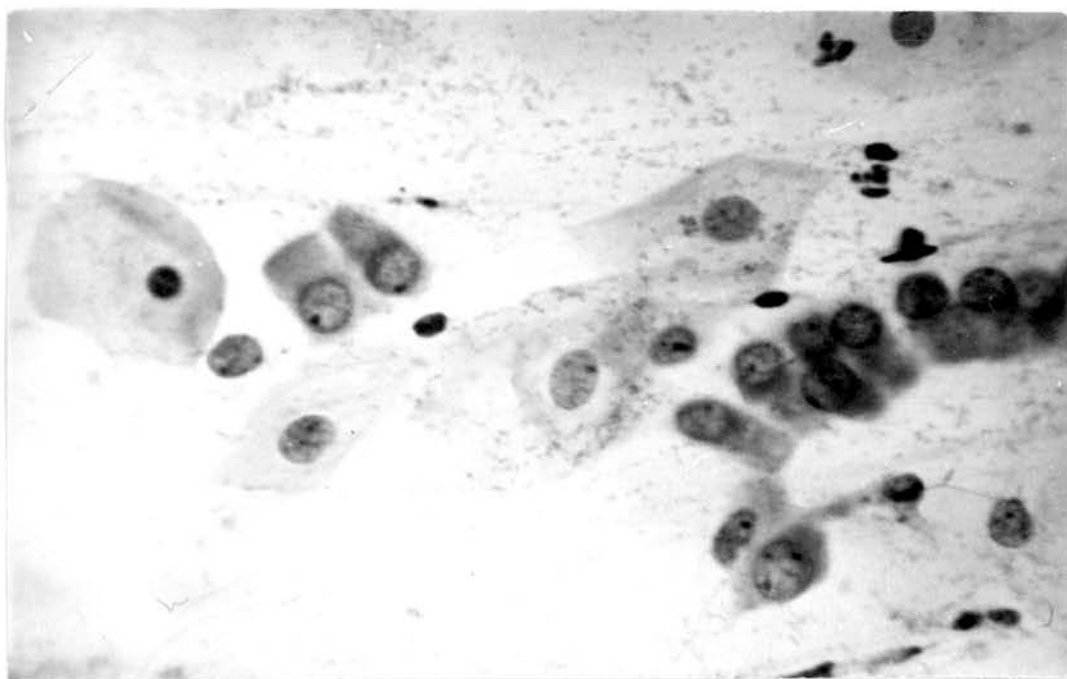
Suspicious smears Class III Smears contain dyskaryotic cells and may, therefore, indicate the presence of an atypical, dysplastic or possibly malignant epithelium.

Positive smears Class IV Smears show a few definitely malignant cells.

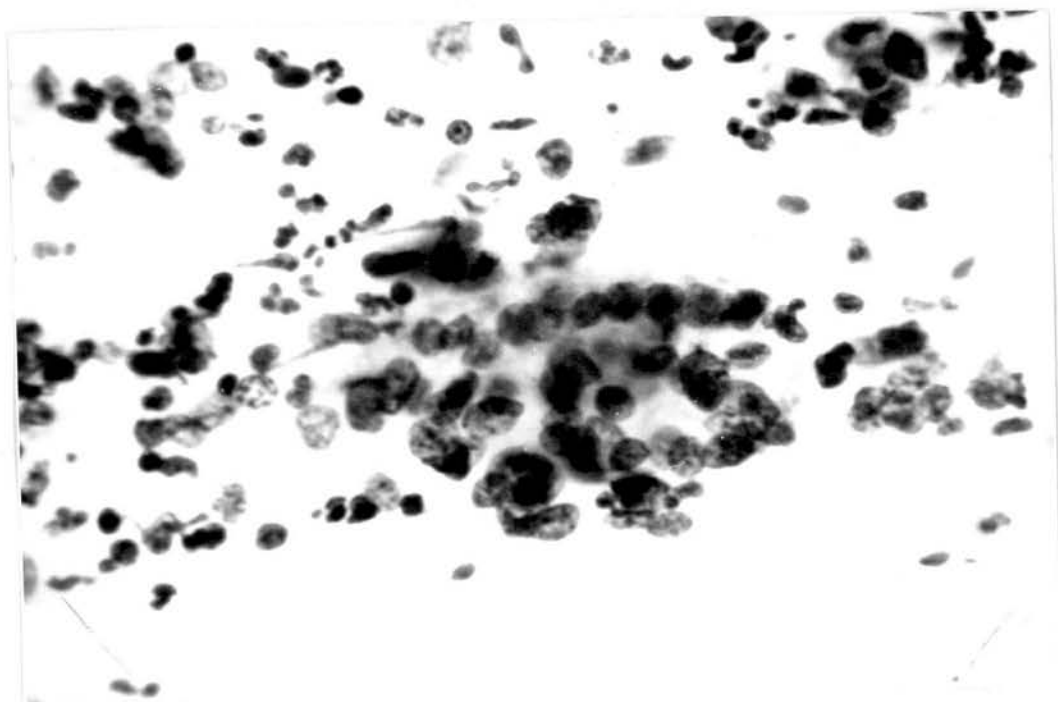
Class V Smears show malignant cells in large numbers.

Illustrations of normal and abnormal smears are contained in Figs. I to IV.

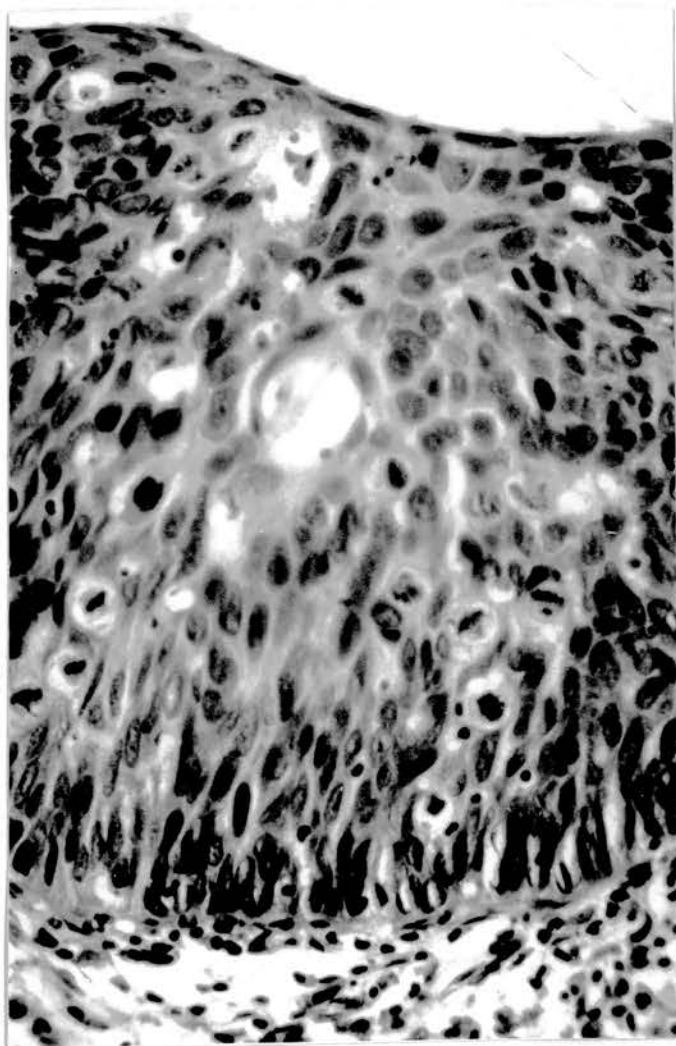
An example of the form used for reporting cervical smears in the W. R. H. B. area is shown in Fig. V. The report indicates the result of the smear (Negative, Suspicious or Positive) and advice re further action, if any. All positive results are automatically referred to the gynaecologists but, in the case of suspicious or negative smears with atypical cells, a repeat smear may



Print I Negative Smear X 420
This shows benign squamous and columnar cells.

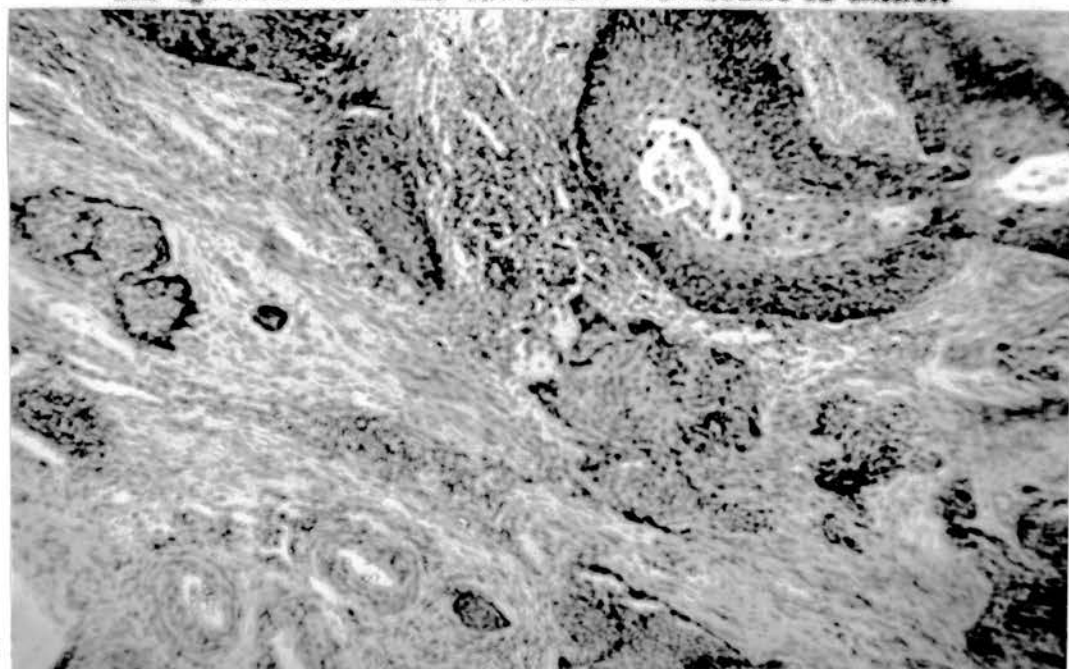


Print II Positive Smear X 420
The malignant cells in this smear show variation in size and shape, hyperchromasia and diminution in cytoplasm; a few "naked nuclei" are seen.



Print III Carcinoma-in-Situ X 210

Malignant cells are present throughout the whole thickness of the epithelium. The basement membrane is intact.



Print

The carcinoma is widely invading the cervical stroma.

USE BALL PEN FIRMLY		WESTERN REGIONAL HOSPITAL BOARD GYNAECOLOGICAL CYTOLOGY		02-08-LABORATORY No.	
09-24-Surname					
25-38-Christian Name				Clinician	
39-80-Address				09-14-Birthdate	
				15-20-Date of Examination	
21-24-Name and Full Postal Address of G.P.				25-28-Sender	
29-34-Hospital Record No.				35-REPEAT SMEAR, Yes 1	
36-44-First Cytology No.					
46-Single 1		47-48-No. of Pregnancies		52-53-Age at Menopause	
Married 2		49-Pregnant: Yes 1; No 2		Date of L.M.P.	
Widowed 3		50-51-Post Natal Weeks		60-Oral Contraception: Nil 1; Past 2; Current 3	
Divorced 4				61-Radiation, Yes 1	
				62-Hormone Treatment, Yes 1	
				63-Cervix: Healthy 1; Benign 2; Suspicious 3; Malignant 4	
				64-Smear Type: Cervical 1; Vaginal 2; Others 3 (Specify)	
Clinical Diagnosis and Comments:				65-Results: Negative 1 Suspicious 2 Positive 3 Unsatisfactory 4	
Pathologist's Comments:				66-Advice: Repeat 1 Referral to Gyn. 2	
Pathologist's Signature				67-68-Recall in months	
Date				WRHB C1c	

FIG. V
GYNAECOLOGICAL CYTOLOGY FORM USED IN
W. R. H. B. AREA

be advised in the first instance.

Histological confirmation of abnormal cytological findings is essential for two reasons:

1. To verify the cytological findings and
2. To localise site of lesion and to define its character and extent.

The value of Colposcopy in aiding in the detection, and location and, possibly, prediction of prognosis of pre-invasive lesions, is highly rated by some gynaecologists. Other means of demonstration of abnormal epithelium are still sometimes used. These include Schiller's test which is based on the failure of glycogen-poor cells in benign and malignant dysplastic lesions to stain when an iodine solution is applied. Toluidine Blue has also been used to demarcate atypical epithelium. The property of Tetracycline and related substances to localise and persist in tumour tissue and the imparting of a yellow fluorescence in ultra-violet light is described by Stallworthy and Bourne (1966).

Histological Appearances of Dysplasia, Carcinoma-in-situ and invasive carcinoma of the uterine cervix.

Dysplasia describes a lesion in which the immature disorderly epithelium replaces some layers of the normal epithelium but does not reach the surface. Therefore, it is covered by an area of normal and apparently mature cells. The dysplasia may be mild or severe according to the degree of cellular abnormality.

Carcinoma-in-situ

Synonyms: Intra-epithelial cancer, pre-invasive cancer,
 Stage 0 cancer.

In this lesion the whole thickness of the epithelium is replaced by abnormal cells. The extent of the affected area may vary considerably in size but it is always limited to the basement membrane.

"Micro-invasion" When the invasion is localised and only recognised on microscopic examination, it is known as "micro-invasion". The term "Pre-clinical" cancer may be used to describe these two lesions.

Invasive Carcinoma

Synonym: Clinical cancer.

In this lesion the malignant change has broken through the basement membrane and infiltrated into the deeper tissues. The clinical stages of cervical cancer are classified as follows:

- | | |
|----------|--|
| Stage 0 | Carcinoma-in-situ. |
| Stage 1 | Carcinoma confined to the cervix; further subdivided into - |
| 1a | Early stromal invasion; micro-invasion. |
| 1b | All other Stage 1 lesions. |
| Stage II | Cancer involves vaginal but not lower third, or infiltrates the parametrium but has not reached the side wall. |

- Stage III** **Cancer involves lower third of vagina, or extends to pelvic side wall with fixation there.**
- Stage IV** **Cancer extends outside the reproductive tract; distant metastases or extension to bladder or rectum.**

Accuracy of cytological screening in cervical cancer:

Comparison of cell collection techniques.

The cervical scrape method of obtaining cells for cytological study is the one in general use in Great Britain but in some surveys, particularly in the United States, the pipette method, both aspiration and irrigation forms, is used, either on its own or in conjunction with cervical scraping and endocervical aspiration smears. Studies have been reported comparing the accuracy of the various methods and these have quoted false-negative rates in carcinoma-in-situ ranging from 30 to 69% for vaginal aspiration and from 0 to 14% in cervical scrape smears (Richard & Vaillant, 1965). Many of these studies are criticised by Richard & Vaillant, as they have not been observed in the same population so that other factors such as economic and social circumstances could affect the conclusions. In their own study they compared the methods in a cytologically known population. They observed a false-negative error rate of 6% in cervical scraping against an error rate of 45% in vaginal aspiration. It is evident from this study that the cervical scrape technique was much more accurate than that of vaginal aspiration.

Macgregor et al. , (1966) compared the efficiency of the

cervical scrape and irrigation smear (taken by the patient) from 356 women and found a higher rate of unsatisfactory smears among the latter - 16% against 2.4% in the cervical scrape smear. The detection rate of microscopically confirmed carcinoma-in-situ was such that two out of three cases were not detected by the irrigation method; the interpretation of the "irrigation" smear proved more time-consuming than the scrape smear. They conclude that the irrigation technique is inappropriate for community screening unless it is impossible to carry out cervical scrapes. Anderson and Clark, (1966) conducted a similar study in 650 gynaecological patients. Of seventeen cases of cervical cancer eventually proven, ten were missed by the pipette and four by the scrape. On second scanning of the pipette smears, malignant cells were shown to be present in eight out of ten originally examined. They supported the contention that these smears were sufficiently different in quality to warrant renewed study by those accustomed to cervical scrape smears only.

Accuracy of Cervical Scrape Technique

Jeffcoate, (1966) emphasised that there is no means of testing the findings in the majority of cases in which smears are reported from "Well-women" as negative. In his series from patients in a gynaecological clinic they found a known false negative rate of one in three-hundred. This series includes 1,620 patients studied over a period of eight years. McLaren, (1967) found 14 proven false negative smears in 151 cases giving a false negative rate of 9%.

This corresponds to the false negative rate of 10% estimated by Bryans et al. (1964) and Greene, (1964). Ryan and Booth, (1967) found a known false negative rate of 28 in 300,000 cases. Garrett, (1964) reported a group of 9 carcinomata of cervix in women who had had a negative smear in the previous year. He assumed that these were false negative smears at the first visit giving a rate of 30%. The fallibility of the first cytology examination has also been emphasised by Dunn, (1966). He states that where the prevalence/incidence ratio is large, as it is for the various histopathological segments of cervical cancer development, and where the screening technique has an appreciable false negative error, the first re-screening will provide an inflated estimate of incidence. He postulates that incidence rates, therefore, should be calculated from the second and subsequent re-screenings.

Knox, (1968) in his review of screening in cervical cancer restates the difficulty in defining error rates, particularly the false negative error. It is generally agreed that the false positive smear is rare in trained hands. The finding of a positive smear will automatically be investigated further and, therefore, the outcome known in the vast majority of cases. Ryan and Booth, (1967) quote 10 cases of true false positive reports in a series of over 300,000 smears.

Sources of errors in smears

1. Taking the specimen: Scrapes not taken from the cervix.

Specimen too scanty. Use of lubricant

other than Glycerine. Drying of smear.

Excessive thickness of smear.

2. Nature of specimen: If invasive cancer is present necrosis may produce a relatively acellular surface or the malignant cells may be masked by the degenerating cells.
- Some "Spray" cancers invade the sub-epithelial structures without coming to the surface. Inflammation and atrophy both affect the appearance of smears.
- The lesion may be in the endocervical canal.
3. Laboratory error: Observer error.

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ETIOLOGICAL FACTORS IN CARCINOMA OF THE CERVIX

It is commonly stated that cervical cancer is rare in nulliparous women and in Jewesses and most common in married women in the lower social classes. These and other factors will now be discussed in some detail as it is important to discern which women are at greatest risk when planning a screening campaign.

Role of celibacy

The observation made by Rigoni-Stern in 1842 of the rarity of cervical cancer in nuns has since been confirmed by Gagnon (1950) who found no record of any cases of the disease in a community of 13,000 nuns over a period of 20 years and by Towne (1955) who reported only 6 cases in a religious community of 10,000 women over the same period.

Low incidence in Jewesses

Kennaway (1948) confirmed the reports of the relative rarity of the disease in Jewesses. Several factors including racial susceptibility, cultural practices in relation to coitus and menstruation and circumcision in the male have all been considered responsible or contributory (Stallworthy and Bourne, 1966).

Relationship to marriage and childbearing

Boyd and Doll (1964) studied the effect of several factors in marriage in a group of patients with cervical cancer and compared these with two groups of controls matched for age drawn from patients (excluding those with genital cancer) in the gynaecological wards and from patients from the medical and surgical wards of

the same hospitals as the cancer patients. Their main findings are summarised as follows:

Frequency of marriage

The cervix cancer group contained fewer unmarried women than the controls and a higher frequency of multiple marriages.

Age at marriage

The average age at marriage of the cervix cancer patients was 22.7 years compared with 23.9 years in the gynaecological control group and 23.8 years in the general control group. In both comparisons the difference with respect to age at marriage was statistically significant (in each case $P < 0.01$).

Broken marriage

In women married under the age of 20 years the frequency was high and differed little among the three groups. With later marriage the proportion broken was higher in the cervix cancer group than in the controls. This difference was so great that the total proportions of broken marriages - whether due to death of husband, separation or divorce - were significantly different ($P < 0.001$ for cervix cancer and gynaecological controls; $P < 0.05$ for cervix cancer and general controls. It is clear that the high proportion of broken marriages in the cervix cancer group cannot be explained wholly on the grounds of early marriage.

Remarriage

The greater incidence of multiple marriages in cervical cancer patients is a function of the incidence of broken marriages

rather than the remarriage rate after the dissolution of the first marriage.

Duration of marriage

No statistical difference in the duration of marriage was observed. Although the cervix cancer group married earlier there was a higher frequency of broken marriage.

Age at first pregnancy

Direct comparison of ages at first pregnancy among the three groups demonstrated this to be significantly lower among the cervix cancer patients.

Number of pregnancies

The apparent relationship between cancer of the cervix and age of marriage and parity was examined further by eliminating the effect of each of these factors in turn from comparisons involving the other. After allowing for possible parity effects, the differences between the cancer group and the controls in respect of age at marriage remained significant. In contrast to this, further study of the number of children after standardisation for age at marriage suggested that the apparent differences that had been noted with respect to parity were a result of the differences in age at marriage and provided no evidence of the independent effect of parity.

Frequency of intercourse

After standardisation for age at marriage, the increased frequency of intercourse among the cancer group was not found to be statistically significant.

Intercourse in relation to katamenia

No statistical difference was observed.

Use of contraceptives

A smaller proportion of the cervix cancer group were found to have used an obstructive method of contraception compared with the gynaecological controls. This difference was just statistically significant ($P = 0.05$).

Circumcision

Difficulty in obtaining accurate answers hampered assessment of this factor but the evidence obtained was essentially negative.

As a result of their studies, Boyd and Doll concluded that major factors found to be associated with cancer of the cervix were

- 1) The married state
- 2) Early age at marriage and
- 3) Multiple and broken marriages.

Lesser associations were found with:

- 4) A high frequency of sexual intercourse and
- 5) Lack of use of obstructive methods of contraception.

In contrast to patients with cancer of the cervix, it was shown that in patients with cancer of the body of the uterus there was a higher proportion of unmarried patients among the cancer group than the controls and that the married patients had married, on average, at a later age than the control group. A high proportion of the patients with cancer of the body of the uterus had never at any time been pregnant.

The effect of coitus and, in particular, the early age at first coitus and pregnancy has already been commented upon in connection with Reid and Coppleson's (1971) hypothesis on the origin of cervical cancer.

Social Status

Reports from screening surveys have repeatedly confirmed the observation that cervical cancer is more prevalent among the lower social classes. Baird (1965) reported that in Aberdeen, the incidence in wives of manual workers was twice that of wives of professional men. Grant (1968) found a prevalence rate of 22.9 per 1,000 - approximately three times the average rate - in a screening survey in Dundee which was directed at the women in social classes IV and V. The high incidence in Negresses could be related to socio-economic factors. A trend to early sexual intercourse and a lower standard of hygiene are possible explanations for the social pattern of the disease.

Role of circumcision and smegma

As has been observed by Boyd and Doll, the role of circumcision has become suspect in view of the discrepancies noted between the alleged and actual circumcision state and of the occurrence of the disease in women whose husbands have unequivocally been circumcised (Aitken-Swan and Baird, 1965) and (Dunn and Buell, 1959). The association between penile cancer and the uncircumcised state (Bleich, 1950) has incriminated smegma. Although Heins et al (1958) demonstrated smegma to be carcinogenic in animals,

there is no proof of this in man. The relative protection of a condom is also consistent with penile hygiene being a factor as is the observation of Rotkin (1967) who found a considerable excess of patients among those who had first intercourse on the ground compared with a heavy excess of controls where first coitus took place in a hotel. It is possible that the condom could prevent seminal "mutagen" getting to the presumptive epithelial cells during the process of metaplasia (cf. Coppleson and Reid's hypothesis). The high incidence of cervical cancer noted in prostitutes and in the lower social classes, as already stated, may be related to a lower standard of hygiene.

Oral contraception

The possibility that a long-term effect of oral contraception could be to increase the risk of cervical cancer has been mooted but there is no positive evidence for this at present. The study of Melamed et al (1969) indicated an increase in the prevalence rate of carcinoma-in-situ for women choosing and using oral contraception compared with that for women choosing and using diaphragms. This study was criticised as the social and ethnic characters of the two groups were not similar and the diaphragm users may have had a decreased prevalence, a factor which has already been observed.

Association of genital herpes and cervical cancer

Several studies are quoted (B.M.J. 1970) supporting an association between Herpes virus Hominis type 2 (HSV-2) and cervical anaplasia but it suggested that further study is required to

decide which of the following three possibilities are correct

1. Both virus infection and cervical anaplasia may be independently related to promiscuity.
2. HSV-2 may grow preferentially in pre-neoplastic or neoplastic cervical tissue and
3. HSV-2 may be the cause of cervical cancer.

Singer (B. M. J. 1971) questions the role of HSV-2 as the exclusive aetiological agent in cervical cancer. He advises caution on the suggested probable carcinogenic potential for this virus in respect of the cervix and demonstrates the variability in antibody prevalence that exists both within social classes and between races. He suggests that the virus exists preferentially in certain populations, its occurrence being most likely related to, and a reflection of, promiscuous sexual behaviour. A positive correlation between HSV-2 antibody titre and the incidence of *Trichomonas vaginalis* lends support to this. Reid and Coppleson (1971) observe that, as yet, HSV-2 has not shown itself to be oncogenic.

Ethnic and racial factors

The higher prevalence of cervical cancer among non-white women is well documented (Kaiser et al. 1960). The relationship to lower social class and possibly poorer hygiene and a young age at first pregnancy may be factors in this. Spencer and Yamamura (1963) found no difference in the prevalence of cervical cancer between one ethnic group and another in Hawaii. Emge (1963) contested this and drew attention to the high incidence of cervical cancer in

Japanese women in whom there is a very low incidence of breast cancer and an even lower incidence of cancer of the body of the uterus. The low incidence of cervical cancer in Jewesses has been attributed by some to a racial immunity while others attribute this to circumcision.

Association of tobacco with cervical cancer

Prompted by the finding of a marked increase in the proportion of tobacco users in patients with genital cancer, particularly of the vulva, vagina and cervix, Tokuhata (1967) analysed the data in more detail. It was found that women in Memphis over 40 years of age who had ever been married and who developed genital cancer were more likely to have used snuff or chewed tobacco than women who had ever been married and had not developed the disease. This would not seem to have much relevance in Britain as the number of women chewing tobacco or using snuff must be very small. It has been observed in this country (Cartwright et al. 1959) and in the U.S.A. that smoking patterns are related to socio-economic class in that the lower social classes contain both more smokers and earlier starters and probably heavier smokers. It is also suggested that there is a higher proportion of smokers among those with broken marriages. As has been observed, these are both considered to be important etiological factors in cervical cancer. The importance, if any, of tobacco in the etiology of cervical cancer can only be in association with other factors as the disease occurs in non-smokers.

Immunological aspects

The immunological aspect of cancer has received much attention recently. It is regarded by many workers that cancer develops as a result of inhibition of normal immunological response. It is suggested that cancer cells may render the lymphocytes incapable of immunological recognition. It is known that there is a higher incidence of cancer in patients given immuno-suppressive treatment after renal transplantation and in certain auto-immune and congenital immunological deficiency diseases. The cancer is mainly of the lympho-reticular type but Walder et al. (1971) found a very high frequency of squamous-cell carcinomata arising from Hyperkeratosis in patients under immunosuppressive treatment following kidney transplants. Way (1967) suggests that "it may be the case that everyone has cancer but few suffer from it and those who do not are protected by an immune process the success of which we are at present unaware; in the study of pre-invasive cancer we may be too late in the development of malignancy to appreciate the successful immunological approach of the body". He considers that the development of carcinoma of the cervix from basal-cell hyperplasia to pre-invasive cancer, micro-invasion and finally invasive carcinoma possibly represents a progressive decline in immunological response.

Association with other pathological conditions

Lawson (1965) refers to the statement that dietary deficiency, especially that associated with liver disease and thiamine lack, may

accentuate apithelial instability. There seems to be no obvious explanation for the observation that there is a significantly decreased risk of cancer of the uterus, both body and cervix, in women with Diabetes Mellitus. (B.M.J. 1970).

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APPLICATION OF CERVICAL SCREENING TO A POPULATION

Once a decision has been taken to offer screening to a population three main questions have to be answered:

1. Who is to be screened?
2. Who is to carry out the screening?
3. At what interval should examinations be repeated?

Who is to be screened?

The restriction of payment to General Practitioners for cervical smears taken only from women aged 35 years and over and who have not had a smear within the previous 5 years, implies that this is a suitable scheme for cervical cytological screening. However, it is shown repeatedly that an appreciable number of carcinomata-in-situ is detected in younger women. Davies and Kelly (1971) in a study of records of 45,552 smears, report an incidence of 0.67% of carcinoma-in-situ in women aged between 25 to 34 years compared with an incidence of 0.75% among those aged 35 to 44 years. Three of the carcinomata detected were in women aged 22 years. Results from other surveys are quoted showing a rate ranging from 4.4 to 5.2 per 1,000 for age group 25 to 34 years and 1.6 to 2.5 per 1,000 for the age group 20 to 29 years. Angerson, (1971) quotes the findings of the combined Edinburgh and Newcastle figures of 1966 which showed that 37.8% of 1,352 asymptomatic pre-invasive and micro-invasive carcinomata detected were in women aged 35 years and under and 58.1% in women aged 40 years and under. McLaren (1971) considers that only pre-

pubertal girls and nuns should be excluded from a screening programme. The relationship of cervical cancer to early age at first coitus and multiple sexual partners causes Peel, (1971) to speculate on what effect the so-called "Age of Permissiveness" will have on the future pattern of the disease. Comprehensive screening in the younger age groups would obviously be of great value in establishing this pattern. The steadily rising incidence of venereal disease in young women is causing national concern at the present time and the high yield of positive smears from this source has already been commented upon. In a study of 1,500 patients attending a V.D. clinic, Lucas and Williams, (1967) found that 45% of patients with positive smears were under 20 years of age. Two of the five cases of carcinoma-in-situ were found in women in this age group. They conclude by stating, "There are valid economic and practical reasons for the restricted scope of the population screening programme proposed by the Ministry of Health. Nevertheless, there is no scientific basis for the age limits and frequency that have been suggested if one is endeavouring to detect and treat all cases of a potentially malignant lesion."

In areas where facilities are still restricted, it is obviously sensible to concentrate on those groups of women in whom the highest yield is to be expected - those aged 35 years and over and those in social classes 4 and 5. It would appear that there are few areas in Britain where there is a necessity for restricted screening judging from the widespread reports of screening surveys.

Who is to carry out the screening?

Cervical smears are collected at the following sources:

1. General Practitioner
 - a. Part of routine pelvic examination.
 - b. Part of routine ante- or post-natal or family planning examination.
 - c. Planned procedure.
2. Hospital
 - a. Gynaecological in- and Out-patients.
 - b. Ante- or post-natal clinics.
 - c. Other In- and Out-patients when indicated.
3. Local Authority
 - a. "Well-woman" clinics.
 - b. Family Planning clinics.
 - c. Domiciliary smears or attendance at factories, etc.
4. Private Enterprise

e. g. Women's National Cancer Control Campaign clinics and similar local enterprises such as Gloucester City & County appeal for cancer prevention.

F. P. A. Clinics
5. Patient

Use of "Do it yourself" pipette.
6. Venereal Disease Clinics

The more sources there are for taking smears the wider will be the coverage of the population so each has an important contribution to make. It is generally stated that the best person to carry out routine cervical cytological screening is the General Practitioner.

As Cullinan and Montgomery, (1965) state "Only he can explain the purpose, importance, scope and limitations of the smear test to each individual patient in the way that that particular patient understands best; and only he can explain any positive result in a way that will not cause alarm to the patient or her family". Drummond et al. (1966) point out that the first inquiries about cervical smears will generally be made to the general practitioner who is in a strong position to influence the patient. The effect on the response when the general practitioner plays an active part is clearly demonstrated by Macgregor and Baird, (1963). Even if the general practitioner is unable or unwilling to take smears himself he can make an important and significant contribution by actively encouraging his patients to attend a screening clinic. Smith et al., (1965) estimated that in an average general practice of 3,000 patients the total number of women at risk would be about 700. Assuming a 60 to 70% response and repeating the smears every three years would involve the practitioner taking about 3 smears per week. Collinson, (1968) screened 80% of his women patients aged between 35 and 60 years within one year by taking approximately 10 smears per week. Rivett, (1964) found that by taking smears at post-natal examinations and whenever pelvic examination was indicated that he had screened 20% of his patients in just over 1 year and that, continuing in this fashion which involved taking smears at the rate of about 9 per month, he would have screened 50% of his patients at the end of 3 years. Newark, (1966) screened 60% of his women patients aged

between 35 and 50 years in one year by taking 6 smears per week. Freeling, (1965) found in a survey of 75 general practitioners that, on average, 10 pelvic examinations were carried out per month. From these figures he calculated that approximately one-ninth of female patients between the ages of 25 and 60 years are examined annually. Thus, the taking of cervical smears need not involve the doctor in any appreciable amount of extra work if he restricts himself to smear-collection from ante- or post-natal patients and as part of a pelvic examination. The extension of cervical cytology to all eligible patients in the practice will depend on the interest and facilities available to the individual practitioner and several examples have already been reported - Ashworth (1966), Collinson (1968), Cullinan and Montgomery (1965), Hodes (1968), Kroll (1970), Lawrence (1968), McElhatton (1966), Newmark (1966), Spenser (1967), Tooley (1971) and Wookey (1971).

McLaren (1963) suggests that many English women "who are shyer than their continental sisters" might prefer the anonymity of a clinic to the privacy of a general practitioner's surgery. The proportion of smears from the various sources over the years will be discussed in detail later but it is interesting to observe at this stage the findings of Sansom et al., (1971) from Manchester. They studied the trends in screening in 3 periods - 1965, 1965-1967 and 1967-1970 and observed that the general practitioner source was the most productive in each period. The relevant figures are shown in Table VII. Spenser, (1967) and Newmark, (1967) found no evidence

to support the contention that patients would prefer a lady doctor to take the smear. Jeffcoate, (1966) is of the opinion that cervical screening should only be done by those competent to pronounce authoritatively on the naked-eye characteristics of the cervix because of the known association of clinical cancer with a negative smear. He notes also that there is a much lower rate of unsatisfactory smears when taken by a gynaecologist - 3 per 1,000 against the figure quoted by Osborn and Leyshon, (1966) that, of smears collected under all circumstances of medical practice, 10% are unsatisfactory. Macgregor et al. (1966) report a rate of 2.4% for unsatisfactory smears in a series of cervical scrapes taken by a trained doctor. The collection of smears by specially trained nurses on a domiciliary basis is described by Osborn and Leyshon, (1966). This approach was aimed at women of the lower socio-economic groups, the very ones in which the disease is most prevalent and at the same time the most resistant to attend clinics for cervical screening. The same can be said about the use of the self-collection pipette. Davis, (1965) reports a survey of 70,000 women in Maryland in which this pipette method was used and which achieved an 83% participation rate. Macgregor et al. (1966) obtained a 55% response in women who had refused a cervical scrape on 3 occasions. The main criticism of this method is that it is not as accurate as the scrape method. Hay, (1965) achieved an acceptance rate of 74% by using this method in a population of 1,200 women.

At what interval should examinations be repeated?

Here again no definite answer can be given until the natural history of cervical carcinoma is finally and indisputably resolved. Much depends on the facilities available and the stability of the population being screened. Macgregor and Baird, (1963) point out the difficulty encountered in the United States because of rapid and widespread movements of population. Jeffcoate, (1966) states that the frequency of rescreening at present at least, is determined by economics as much as scientific knowledge. Jordan, (1969) suggests that, ideally, the smear should be repeated every year, but in view of the large number of smears this would entail, a compromise can be reached by taking the first repeat smear after one year in an attempt to pick out those whose initial smear had been reported falsely as negative, and thereafter every three years. Macgregor and Baird, (1963) arranged to rescreen at five year intervals, which is the interval recommended at present by the Ministry of Health. They consider that, if rapid progression should prove to be exceptional, positive smears found on re-examination after a five-year interval should be coming from a pre-invasive lesion, or, less often, an early invasive but not clinically diagnosable cancer. Rhodes, (1971) observes that, although the average pre-invasive duration is between 10 and 15 years, one cannot say how long a pre-cancerous lesion has been present before the test. The rapidly-progressing lesion and the fallibility of the test must also be taken into account. He suggests that women on oral contraception should ideally have annual smears. This is

also recommended by Attwood, (1965) who found a high incidence of dyskaryotic squamous cells in smears from this group of women. McLaren, (1963) states "the sooner carcinoma-in-situ is removed the better, for the time-table of its future progression to invasive carcinoma in any particular individual is not known; while the condition may stand still for years, invasion may start tomorrow!"

TABLE VII

Proportions of cytostests received from each agency January - April, 1965, October, 1965 - October, 1967 and November, 1967 - October, 1970.

(Ref. Sansom, Wakefield and Yule, Departments of Social Research and Diagnostic Cytology, Christie Hospital and Holt Radium Institute, Manchester.)

Agency	1965	1965-67	1967-70
G. P.	41.5	38.1	40.7
LHA	25.5	33.1	36.9
FPA	33.0	28.9	22.4
Total	100.0	100.0	100.0

With regard to the woman with a positive or suspicious smear, Jeffcoate, (1966) emphasises the necessity of retesting at frequent intervals as dictated by the individual circumstances. This applies to cases of carcinoma-in-situ however treated because "this disease is often merely one manifestation of a widespread field-change and its elimination in one site does not preclude its later appearance elsewhere - in the vagina for example". This is corroborated by

Anderson, (1965) who states that follow-up should be for life.

Practical and psychological aspects of rescreening must also be considered. Macgregor and Baird, (1963) suggest that, in general, the more frequently examinations have to be done to be effective, the less likely is such a scheme to succeed. However, the interval of five years presents difficulties in that patients may be difficult to trace; even in a relatively stable population, migration, often within the area but none-the-less out of touch, is the most besetting factor in attaining a satisfactory recall response. In some areas it might prove difficult to keep a clinic viable and for this reason alone a two to three year recall may be indicated.

The general practitioner is, once again, shown to be in an advantageous position when the question of recall smears is considered. He is in continuing contact with his patients and thus should have less difficulty in tracing their whereabouts. Also, if he is carrying out screening himself, there is the great benefit of continuity both of personnel and venue.

Women "smeared" at Gynaecological or Obstetrical clinics or non-continuing screening projects will require to arrange for their own follow-up. While some may attend a Well-woman or Family Planning clinic or reappear at an ante-natal clinic, it would seem likely that many would simply not bother. The general practitioner and his Health Visitor can therefore play a most important part in identifying such women and encouraging them to be rescreened. At present, the arrangements for recall are in the hands of the

respective sources so that varied schemes are possible depending on the attitude of those concerned. However, with the impending computer recall system, arrangements may have to be altered to comply with the whole area served by the computer. The promise of assistance with the recall of patients is welcome. The subject of recall and response etc. will be discussed in detail later. It is interesting to note that a high proportion of women are ignorant of the fact that they have had a smear taken (Sansom et al, (1971); if comprehensive follow-up screening is to achieve any measure of success, this lack of communication must be overcome.

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CHAPTER VA REVIEW OF FACTORS AFFECTING RECRUITMENT OF WOMEN
TO A CERVICAL CYTOLOGICAL SCREENING PROGRAMME

Experience of cervical cytological screening in several countries has demonstrated a certain pattern of response from women invited to avail themselves of the test. Wakefield and Baric, (1965) analysed the findings of Macgregor and Baird, (1963) in Aberdeen and of the British Columbia survey, (Bryans et al., 1964) along with the observations of public response to screening programmes reviewed by Breslow and Hochstim, (1964) and Gallup, (1964). They conclude that some women - possibly around 10 per cent - will respond when they become aware that the service is available. A greater number - about 40 per cent - need some additional stimulus, such as publicity or educational efforts, to be persuaded to attend. The remainder will not respond to such measures of persuasion and represent the hard core of resistance in a programme. It has already been shown that the highest yield of positive smears is to be expected from this group which is largely composed of women in the lower social classes and those in the older age groups. It is necessary therefore, to study the available methods of recruitment to find out which prove the most effective and to determine if there is any difference in the response from the various sources of smear collection. The attitude and reaction of both doctor and patient to screening must also be considered.

In most of the reported surveys in this country a combination of methods of recruitment are employed. In some instances the

first approach was by letter, (Macgregor and Baird, 1963, Spenser, 1967 and Collinson, 1968) while in others the display of posters and leaflets, such as those produced by the Central Council for Health Education, describing the purpose and nature of cervical screening was found to be a good way of introducing the idea and arousing interest. (Wookey, 1971 and Cullinan and Montgomery, 1965).

Examples of some of the letters sent to women are shown in Appendix I. A letter, which in some instances was followed up by a second letter, proved an effective way of enlisting some of Wakefield and Baric's second category of women by supplying the necessary additional stimulus but, in nearly all the surveys in which letters of invitation were sent, a follow-up visit either by the doctor initiating screening or Health Visitors greatly enhanced the response. A letter was sent only at a late stage in my survey. Those women who were being invited for the first time responded well but a very poor response resulted from those who had been invited previously but failed to attend.

The response to a poster alone is disappointing. Cullinan and Montgomery estimated that only 3.7 per cent of approximately 1,100 women who came into contact with the posters asked spontaneously for the test to be done. Wookey, too, found that the response to a poster soon faded. The benefit of personal contact at any stage of promotion of a screening campaign is unquestioned. It is probably the most effective single method of recruitment but can be usefully supported by the impersonal ones.

Sansom et al. (1971) investigated the primary sources of information on cervical screening in a random sample of 180 women who had had a smear taken by their doctor in 1965. This information was analysed in respect of age and social status. A sharply defined gradient was noted when the source of information was studied in relation to social class. More women in social classes I and II had learned of the test through the mass media (radio, television and articles in the daily Press and women's magazines) than had women from the lower social classes who were more likely to have acquired the information from personal sources. These sources comprised any form of face-to-face information such as with doctor, clinic staff, friends, or kin. Grant (1968) investigated the source of primary information for the first 200 women in his survey comprised mainly of those from S.C.s IV and V. He found that in only 6% the information came from mass media. Women who heard of the test from personal sources were almost equally divided between the two age groups considered viz. those under 35 years and those 35 years and over. Of the women who learned about the test from mass media, those aged 35 years and over were in the majority; this observation is therefore of importance when considering how to increase the response in the older age groups. The dissemination of information by addressing assemblies of women and by showing films such as "Time and Two Women" may not be as important now that there is a considerable number of women experienced in screening in the community but this proved valuable in the early

days. I found this a worthwhile exercise and welcomed the added stimulus of a series of programmes on cervical cytology shown on the local independent television channel around the time of the commencement of my survey. This was a method of approach which reached husbands who can play an important part in persuading their wives to go for a smear. Ashworth et al. (1966) sent a letter to the husbands of half of the women who had failed to respond to a previous letter inviting them to attend for a smear. Out of the 61 of the 1,097 women invited, 41 came in response to the letter to the husband. Wookey, (1971) also comments on the effective persuasive power of a husband.

Local Authority clinics recruit their patients somewhat differently. Many women are referred by their general practitioner. It is noticeable in the Dumfries area that, where there is a Well-woman clinic in the vicinity, the local practitioners encourage their patients to attend there in preference to taking the smears themselves. Some invite women by letter, (MacTaggart et al., 1968, Hall and Warin, 1966) which is sent by the Health Authority but takes the form of a personal letter from family doctor to patient. Much reliance is put on the advertising of Well-women clinics in the local Press, posters in Welfare clinics, public conveniences and, in some instances, in public transport. In many cases this impersonal approach is reinforced by conversation with health visitors and other clinic nursing and lay staff. Grant (1968) attributed the success of his screening programme in Dundee to the endeavours of the health

visitors. The good response was all the more creditable in view of the fact that the neighbourhood purposely chosen for the clinic was one where social problems abounded. Poliomyelitis immunisation of the young children was below average, few women were on oral contraception and there was a high rate of unemployment; these are a few of the discouraging features of the area. It was planned for quite a different clientele from that of Garrett, (1964) who said of his clinic in Sydney, "Rather we are a fashionable clinic and patients come from the Bridge Clubs and Tennis Clubs of the better class suburbs".

Parry and Wilson, (1971) obtained a very good response by holding smear sessions in local factories. Other firms provided transport to take their employees to the L.A. clinic. The domiciliary smear service in Derby described by Osborn and Leyshon, (1966) is a good example of "Mahomet going to the mill." The high yield from this survey was a good reward for boldness.

Smears taken in "captive situations" such as in Obstetric clinics or as part of a routine pelvic examination either in hospital or by the general practitioner could provide an effective initiation to regular screening. For this to be so, however, the patient must be made aware that she has had a smear taken and that it should be repeated at regular intervals. This subject will be discussed later in connection with follow-up smears.

From their study of the trends in cytological screening in the Manchester area between 1965 and 1971, Sansom et al., (1971)

TABLE VIII

Response to a 3-month recall scheme by agency, September, 1967 - August, 1968.
(Ref. Sansom, Wakefield and Yule, 1971, Community Medicine, 126, 254). Departments of Social Research and Diagnostic Cytology, Christie Hospital and Holt Radium Institute, Manchester).

Agency	Total	Responders	%
G.P.	1,785	966	54.1
L.H.A.	1,977	962	48.7
F.P.A.	934	525	56.2

TABLE IX

Social class and source distribution of cytostests (percentages), January - April, 1965 (n = 4,905), October, 1965 - October, 1967 (n = 37,588) and November, 1967 - October, 1970 (n = 239,484).
(Reproduced from Sansom, C.D., Wakefield, J. and Yule, R., Community Medicine, 1971, 126, 253.)

Social Class	1965				1965-1967				1967-1970			
	GP	LHA	FPA	Total	GP	LHA	FPA	Total	GP	LHA	FPA	Total
I	2.5	0.9	1.9	5.3	2.7	1.7	2.5	6.9	2.3	1.4	1.5	5.2
II	5.9	3.4	6.6	15.9	7.0	5.3	5.8	18.1	7.2	5.0	4.4	16.6
III	15.3	14.2	18.1	47.4	18.5	18.3	14.7	51.5	20.5	29.0	11.9	53.3
IV	3.3	2.7	2.8	8.8	3.8	3.8	2.4	10.0	5.1	5.7	2.3	13.1
V	2.0	1.4	1.8	5.2	1.5	1.3	0.9	3.7	2.0	2.2	0.8	5.0
Unclassified	12.7	2.9	1.9	17.5	4.5	2.7	2.6	9.8	3.6	1.8	1.5	6.9
Total	41.5	25.5	33.1	100.1	38.0	33.1	28.9	100.0	40.7	37.0	22.4	100.1

make 1965; 1965-67 and 1967-70. The proportion of cytotests from each agency in the three periods is shown in Table VIII. It is seen that the Local Authority clinics have been responsible for an increasing proportion of cytotests since 1965. The proportion from family doctors has not varied greatly, but that from the Family Planning Association clinics has decreased. This is attributed to the fact that many FPA clinics took smears from non-members who were unable otherwise to have this done prior to the setting-up of the Local Authority clinics. Also, one would expect the FPA to have a fairly constant number of members which would lead to a declining proportion in relation to the increase elsewhere. With regard to social class, the overall picture is still one in which social classes I, II and III are over-represented and classes IV and V grossly under-represented. The social class and source distribution are shown in Table IX. Certain developments are discerned:

1. The proportion of screened women who have had a cytotest at FPA clinics has decreased in every social class.
2. With the exception of S. C. I and the unclassified group, the proportion of women tested by family doctors has increased in each class.
3. In all three periods, family doctors continued to take the major responsibility for the testing of women in the upper two social classes.
4. Doctors and L.A. clinics have consistently and markedly increased the proportion of women they draw from S. C. III.

TABLE X

Proportion of Cervical Smears according to Age and Practice Population

Survey	Age Group	No. of Women available	%	No. of Smears	%	% of Total smears by age
Kroll 1963- 1968 St. Paul's Cray	20-29	845	(24.96)	317	(37.51)	(17.53)
	30-39	653	(19.29)	390	(59.72)	(21.57)
	40-49	1112	(32.85)	745	(67.00)	(41.21)
	50-59	775	(32.9)	356	(45.59)	(19.69)
	Total	3385		1808		
Macgregor 1953-67 Aberdeen	20-29	9295	(20.02)	9074	(97.62)	(27.54)
	30-39	12456	(26.82)	9392	(75.40)	(28.51)
	40-49	12318	(26.53)	8025	(65.15)	(24.36)
	50-59	12418	(26.74)	6457	(52.00)	(19.6)
	Total	46437		32948		
MacTaggart et. al., 1966 Torbay	20-29	143	(12.01)	133	(93.01)	(12.86)
	30-39	253	(21.24)	234	(92.49)	(22.65)
	40-49	349	(29.30)	309	(88.54)	(29.91)
	50-59	446	(37.45)	357	(80.04)	(34.56)
	Total	1191		1033		
Rose 1964-70 Dalbeattie	20-29	198	(19.08)	196	(98.98)	(21.26)
	30-39	282	(27.17)	269	(95.39)	(29.18)
	40-49	301	(29.00)	279	(92.69)	(30.26)
	50-59	257	(24.76)	178	(69.26)	(19.31)
	Total	1038		922		

5. The smallest changes over time are seen at the two extremes of the social class scale, S. C. I. and S. C. V.
6. The increase in the proportion of women in S. C. IV examined by both family doctors and L. A. clinics has been consistent, though not very large, since 1965.
7. The increased proportion of women in S. C. V. examined by family doctors and L. A. clinics for the period 1967-70 is a reversal of the earlier downward trend.

There is no evidence from these very substantial numbers that women from S. Cs. III, IV and V have any marked preference for a smear taken either by the family doctor or at a L. A. clinic. Family doctors and L. A. clinics are therefore of equal importance in screening women in the three lower social classes.

No clear pattern regarding the relationship between age and response emerges from a study of those surveys where the age structure as well as the response is given. Table X shows figures from four surveys including my own. It is observed that in four of the surveys, the highest response is from women aged 30 to 39 years. However, in the survey reported by Kroll, (1970) the highest response was in the 50 to 59 years old. Nothing in the age structure nor character of the practice suggests that it differs from others. MacTaggart et al, (1968) also obtained the highest yield from the women aged 40 years and over but this is no doubt due to the greater proportion of older women in Dartmouth where the survey was conducted.

A study of the report of Macgregor, (1967) shows that 74.8 per cent of women under 60 years of age in Aberdeen had been screened at that stage and that 70 per cent of the women screened were under the age of 40 years. In the report of the findings after ten years of screening in Aberdeen, Macgregor et al, (1971) state that the coverage has risen to 97.3 per cent of the female population under 60 years. It is evident that the older women must have been recruited after 1967 in order to achieve the magnificent overall response of 97.3 per cent. The age of the women smeared is not stated in the 1971 report.

The proportion of the total number of women smeared for three age groups - those under 35 years, under 40 years and under 45 years - in surveys conducted by general practitioners and by Public Health doctors is shown in Table XI. It is seen that 50 per cent of the smears were taken from women aged 40 years and under in all the surveys except those of MacTaggart, (1968) and Kroll, (1970). The relatively poor performance of the older women in respect of cervical screening is reflected in the statement that of approximately 1,850,000 cervical cytological tests performed in 1970, in Britain only about one half were from women aged 35 years and over, B. M. J., (1971). This feature will be taken into account when discussing publicity and educational aspects later.

From results of their study of public and professional attitudes to screening in cervical cancer in Manchester, Wakefield and Baric, (1965) confirm the opinion expressed in studies in the U. S. A. and Canada that the general practitioner is the key man for taking smears.

TABLE XI

Proportion of Cervical Smears by Age

	Total No. Smears Women aged 15-59 yrs.	Total No. Smears Women aged under 35 yrs.	Total No. Smears Women aged under 40 yrs.	Total No. Smears Women aged under 45 yrs.
<u>G.P. Surveys</u>				
Macgregor, 1958-67	34348 (%)	20366 (58.5)	24696 (71.1)	28391 (80.2)
Wookey, 1966-70	1551 (%)	644 (41.5)	880 (56.7)	1090 (70.3)
Kroll, 1963-68	1808 (%)		707 (39.1)	
Lawrence, 1963-67	700 (%)		553 (79.0)	
SE Scot. Fac. Coll. GPs 1955	1000 (%)	577 (57.7)	700 (70.0)	825 (82.5)
Rose, 1964-70	980 (%)	335 (39.2)	523 (53.3)	661 (67.4)
<u>P.H. Surveys</u>				
Grant, 1966-67	1661 (%)	668 (40.2)		1299 (78.2)
Parry etc. 1966-70	17142 (%)	7638 (44.8)		12340 (71.8)
MacTaggart etc. 1966	1033 (%)		367 (35.5)	
Dumfries Area W. W. Clinics, 1969	1989 (%)	647 (32.6)	998 (50.1)	1345 (67.4)
<u>W.R.H.B.</u> <u>Area, 1969</u>	74245 (%)	43087 (57.0)	53898 (71.1)	62110 (82.3)

(Read, 1964; Day, 1964; Breslow and Hochstim, 1964 and Bryans et al, 1964). In Breslow and Hochstim's study, it was shown that 90 per cent of the women who had had a smear in Alameda County, California had been persuaded to do so by their own doctors. The general practitioner can contribute in two ways: by taking smears himself, either on a screening basis or incidentally and by influencing his patients to have a smear taken at a well-woman or similar clinic. He may be initiator in some instances while in other he adopts the role of promoter. The sources of first information about the test have already been studied but it is evident that in his traditional role of guide and counsellor, the doctor is in a key position. The effect of the active interest of the doctors is well illustrated in the screening survey in Aberdeen described by Macgregor and Baird, (1963).

In the practice where there was active co-operation from the doctors there was a reply rate of 79 per cent from patients who were invited to have a smear taken. The comparable reply rate in the practice where the doctors were less enthusiastic was 51 per cent. The whole-hearted co-operation and involvement of the general practitioners in the survey carried out by MacTaggart et al, (1968) in Dartmouth resulted in an overall acceptance rate of 86.7 per cent. It is stated that previous separate efforts of general practitioners and Public Health staff to interest women in cervical screening had had only very modest results.

Wakefield and Sansom, (1968) studied the performance of doctors in a cervical screening programme in Manchester. Of 2,034 cervical smears submitted by 212 general practices over a 3-month period,

half the practices had provided only 10 per cent of the smears. Only one smear came from 24 per cent of the practices. Fourteen practices accounted for nearly 29 per cent of the smears. Two-thirds of the practices which had sent smears had two or more doctors and they had taken 80 per cent of all smears. Nearly half the smears came from only 29 of the practices with more than one doctor.

The performance of the general practitioners in the Dumfries Pathology laboratory area will be fully discussed later but a brief description at this juncture serves to illustrate some of the features of the pattern and extent of participation in cervical cytology. The analysis is based on the smears submitted in 1970. Dr. Scott, the Pathologist, assures me this is a true representation of the pattern which has emerged over the six years in which the service has been available to general practitioners. Two-thirds of the practices submitted smears ranging from a total of 1 to 446 smears during 1970. Twenty-six practices were responsible for one-third of the total smears and the remaining two-thirds were sent from four practices. The doctors situated in areas where Well-woman clinics are held tend to refer their patients to these clinics in preference to taking the smears themselves. Over 80 per cent of the doctors in Galloway, which is the more rural western part of the area, submitted smears compared with 45 per cent of the doctors in Dumfries county and burgh; this is probably related to the siting of Well-woman clinics. There was no obvious difference between single-handed and partnership practice in participation in cervical cytology. The five doctors aged under 35 years in Galloway submitted

131 of the 307 smears from practices sending less than 60 smears in one year; this confirms what one would expect, as these doctors would become familiar with cervical cytology during their professional training. It is interesting to note however, that the older doctors were well represented. The four practices in Stranraer Health Centre submitted 80 smears during 1970. This corresponds to the performance of the practices in the rest of the region. There is no evidence therefore, in this year, that Health Centre practice differed from others in smear collection. Two group practices were responsible for 50 per cent of the total number of smears submitted for the whole area in 1970. The attitude of the doctor appears to be more significant than the type of practice to which he belongs. There are four women practitioners in the area. Two of these sent no smears at all. One single-handed doctor sent 17 and my contribution was 445 for the year. One could hardly imagine a more varied response!

Wakefield and Baric, (1965) concluded that few general practitioners in the Manchester area were fully aware of the importance of their role in the screening programme. Although a large number of doctors expressed interest in participating in cervical screening, the actual differed greatly from the potential. This observation had also been made by Ashworth, (1963) and also applies to this area. All practitioners in the area were invited to attend a demonstration and discussion of cervical cytology prior to the introduction of the service to general practice. The enthusiasm and declared intention to take part is not reflected in the actual performance, particularly

in Dumfries burgh and county; the advent of the Local Authority Well-woman clinics in the following year may have changed some of the practitioners' attitude.

The Attitude of Non-Attendees

The non-attendees in a cervical cytological screening programme can be divided into four main groups - those who emphatically refuse, those who express their intention to attend but fail to keep appointments, those who give a reason or reasons and lastly, those who neither refuse nor give any reason for not attending.

Women who absolutely refuse to attend are often equally unforthcoming about their reasons for this attitude. In my experience, this type of response tends to be commoner among the older women invited to participate in a screening programme. It is encountered in all social classes and at all levels of education. Examples of "emphatic refusers" in my practice include two secondary school teachers and a Colonel's wife; none of these three would be drawn into giving any explanation for their attitude. As has been said earlier, the patient with a rather hostile aggressive manner features among the non-attendees. Perhaps this is a way of venting aggression! In the less well-educated it seems that this attitude is associated with ignorance of the nature of the test and the fact that any form of cancer is curable. Even if one takes the trouble to describe and explain the purpose and simplicity of the test, some women seem unable or unwilling to appreciate the potential benefit. Greater educational effort and publicity to inform and attract women's

interest in cervical cytology may convert some of this group but there will no doubt always be a hard core of "non-conformists" in the community.

Some women accept invitations to attend for a smear without demur and then fail to keep the appointment. When asked why, they did not appear, one is sometimes given an explanation such as "the baby was sick" or "somebody came in" but other times no comment is made. Some people seem to be quite happy to accept appointment after appointment and yet have little or no intention of attending; this type of patient may be frightened of offending the doctor by openly refusing. In other cases, the patient seems genuinely keen to attend but cannot bring herself to do so. My patient who said she wanted to come but that her nerves would not let her is a good example. Refusal or failure to attend may be due to fear of cancer. This applies also to those who offer some reason for not coming and may underlie many of the vague and casual replies. It is difficult to believe that anyone could really not be bothered or not have time to attend. Sometimes a woman says she would rather not know or would be too frightened to consider the idea that she might require treatment as she would be unable to get anyone to care for her children if she had to go into hospital. Surely, greater information and a better understanding of the need to detect cervical cancer in its presymptomatic phase would help to dispel these fears. Wakefield and Baric, (1965) comment on the unwillingness of the medical profession to mention cancer: this is certainly often so when one is confronted by a patient who has advanced or irremediable disease but this should not apply to the

detection of the in-situ lesion. I avoid using the rather harsh term, "cancer test" and emphasise that we are looking for changes which might progress to cancer if left undetected and untreated. The occurrence or history of cancer in the patient's family or among her friends may either persuade or dissuade the patient. Two sisters of one of my patients found to have an in-situ lesion refused to attend while other patients have mentioned the fact that hearing of an acquaintance or relation having cancer has prompted them to attend. Hill, (1971) makes some interesting observations on the role of fear as a motivational factor in cervical screening. Two hundred and seventy four randomly selected women in Melbourne were interviewed with the aim to identifying variables related to the presentation for cervical screening. In response to the question "What disease would worry you most if you thought you had it?" 85 per cent said cancer. The question whether fear of cancer was a negative or positive motivational factor was then explored in the tested and untested groups. They found that test-seeking and cancer were significantly related but considered it unwise to expect that attempts to raise cancer to the status of the "most worrying" disease would necessarily result in raising the test-seeking behaviour as, it may be, that failure to name cancer as the most worrying disease in some respondents serves as a defensive function against anxiety; this could be the type of respondent who characteristically rejects the test, who offers a non-fearful rationalisation for this behaviour and who represses or denies the thought of cancer as the most worrying disease. Two types

of response to fear-arousal are suggested: 1. Those potentially or actually motivated to take preventive health measures by fear of the consequences of not doing so and 2. Those who are overtly less fearful of the consequences but covertly more anxious and defensive and for whom the promise of a happy outcome to health measures advocated does not provide sufficient incentive to counteract their strong avoidance tendencies. An educational programme would require to be geared to avoid engendering this second type of response.

The laconic group who neither bluntly refuse to attend for a smear nor give any reason for not doing so are difficult to persuade but, with time, this type of person can be recruited.

What does one learn from these observations?

It is apparent that all sources of information are important in informing and attracting women to avail themselves of cervical screening. Personal contact is probably the most fruitful source and it is in this role that the general practitioner can be so effective. A tremendous opportunity to introduce women to regular screening will be wasted if those first smeared as part of a routine pelvic or obstetric examination are not informed about the test and impressed with the need to have regular follow-up. A plea is made by Peel and McLaren, (1971) for more emphasis to be placed on cancer prevention as opposed to cancer research so that more women can be recruited to cervical screening.

Follow-up Smears

Follow-up is studied under two separate headings, the follow-up

of abnormal smears and the routine rescreening of women with previously negative smears.

Follow-up of abnormal smears

The sequel to the finding of an abnormal smear varies with the source from which it is obtained. If the general practitioner has taken the smear, the report is sent to him by the pathologist with the recommended further action. A repeat smear may be indicated in the first instance but, in others, direct referral to the gynaecologist for cervical biopsy is arranged. The general Practitioner is able to inform the patient of the result and warn her of the intention to admit her for further investigation. I remember, so well, the first occasion on which I received a positive result from one of my patients and the trepidation I felt when going to tell her. I was struck by her calm and co-operative reaction and she was even able to say how grateful she was that the test had been done. This calm acceptance has been the rule on each occasion when I have had to tell a patient that she is to be admitted to hospital. Two patients resented the fact that the smear was to be repeated and one has since defaulted from regular follow-up but these are exceptions.

If an abnormal smear is received from a woman attending a Local Authority or Family Planning Association clinic in the Dumfries area, the report of the smear is communicated to the family doctor with the appropriate recommendations. It is left to him to decide whether to take a repeat smear himself, if this is indicated, or refer the patient to the clinic where the original smear was obtained. It is the doctor's responsibility to warn his patient of impending

hospital admission if this has been arranged. It is disquieting to read the comments by Cochrane, (1965) on the subject of the problem of cases or conditions detected in surveys being referred to general practitioners and not treated at all. He found this to be a "terrible" problem in Wales and states that the quantity is quite large and applies to all conditions detected. Where this problem is found to exist, the doctor must be encouraged to co-operate and fulfil his obligation to his patient. It is, after all, the patient who is at risk, if not followed up. Patients attending gynaecological or obstetric clinics and found to have an abnormal smear will be automatically followed up by the hospital staff. The necessity to follow-up patients who have been treated, either conservatively or by hysterectomy, for in-situ lesions has already been stressed. This can be done by the general practitioner if he is informed and willing.

Routine rescreening of women with previously negative cytology

It is obviously desirable to decide on the interval to be selected between repeat examinations at the outset of a screening survey so that the woman can be informed approximately when she will be due for recall, providing the current smear is negative. In my practice we keep a chronological list of smears taken, both at screening sessions and as part of an ante-natal or pelvic examination. The patient is automatically recalled by letter when the next smear is due. This procedure is simple and not unduly time-consuming. It has been suggested that the woman should be made responsible for arranging for follow-up smears. This is hardly likely to produce a good

follow-up response, especially of the women most at risk. It is essential to impress and keep impressing patients that they must report any abnormal symptoms no matter when their last smear was taken. There is no doubt that there is a tendency to believe that nothing can be wrong if the smear was negative hence the necessity to warn them.

The Well-woman clinics in this area send invitations to the women screened three years earlier. The patients attending family planning clinics are seen regularly so that repeat screening is no problem. There is a great dearth of information about what happens to women screened at a hospital clinic. Macgregor, (1966) suggests that a register of patients smeared at ante-natal clinics should be kept so that these women could be followed up but she does not state by whom. Wakefield and Baric, (1965) from their survey of screening programmes showed that inadequate provisions were made for the recall of women. From their interviews no unique answer emerged to the question on whom responsibility for recall should rest. One opinion commonly expressed was that responsibility should be left to the women themselves; this is considered impractical, since many of them either had no idea why the doctor had taken a smear, or were unaware that it had been taken at all. Some considered that the responsibility should lie with the General Practitioner who has records of his patients and could add further information on the smear test to them under the present system, even this solution is impracticable, since most clinics inform the General Practitioner only about abnormal smears.

The lack of awareness that a smear had been taken or what it was for has been commented on by other workers. Cannon, (1969) in her analysis of a 2-year survey of a cervical cancer detection clinic in Adelaide encountered this lack of knowledge quite frequently. Sansom et al, (1971) found that 61 per cent of 180 women who had smears taken by general practitioners in Manchester in 1965 had had this taken as part of a pelvic examination and 14 of these women had not known that they had had the test. This seems to be a sad and unnecessary failure in communication. Clearly, the role of the doctor is crucial in those circumstances where a first smear is not being taken as a formal screening procedure. The follow-up of the ante-natal or post-natal patients seems to be left to chance in many cases. Some will return in time to these clinics or will be seen at family planning clinics so that all is not lost. The women tested at gynaecological clinics are in danger of being lost to follow-up unless definitive arrangements are made by the general practitioner. It may be that, in some areas, a recall system for hospital patients does exist.

Another frequent opinion was that responsibility should be centralised and that invitations for repeat smears should be sent to each woman at appropriate intervals. The recent announcement of a national computer scheme for recall of women for cervical screening would meet this. A great deal of discussion must take place before such a scheme is put into operation if it is to be successful. It must be decided who is to carry out the screening and how the women are

to be notified. A suggestion has been made in the Dumfries area that the lists of women due for recall should be sent in the first instance to the appropriate Medical Officers of Health who would then contact the family doctors concerned. If the doctor did not wish to carry out the rescreening, the M. O. H. would arrange for the woman to be invited to attend a Local Authority clinic. Invitations on behalf of the family doctor wishing to do his own screening would also be sent from the M. O. H.'s office thereby relieving the practice staff of this chore. This scheme sounds quite practicable and would include those patients previously screened at Hospital clinics.

Whatever scheme is devised, it is the general practitioner who is at the centre of things and thus must be involved when devising a system which would be acceptable and practicable in the area under review.

Response to Re-screening

There is little published information on this subject. Most of the surveys reported deal with the response to first screening. Sansom et. al., (1971) analysed the response to the first three months of recall of patients in 1968 who had first been screened three years previously. A response rate of 53.8 per cent was found and this did not vary greatly over the social classes or among the three main sources of smear collection i. e. General Practitioner, Local Authority and Family Planning Association. Dr. Frain Bell, (1972) has kindly supplied me with the preliminary unpublished findings from her Local Authority clinic in Dundee of the first recall in 1971

TABLE XII

Local Health Authority Well-Woman Clinic, Dundee, 1971
 Response to Recall of Women first screened in 1966.
 (Approximate Figures supplied by Dr. C. Frain Bell)

Total Number of Women Called	344	
Total Number of Women Attended	179	(52.03%)
<u>Failed to Attend</u> (reasons, if any, given)		
No Reason	77	(46.66%)
Refused further smear	5	(3.03%)
Smear already taken elsewhere	35	(21.21%)
Subsequent Hysterectomy or Pelvic Floor Repair	4	(2.42%)
Unable to come	2	(1.21%)
Left area - Not traced	26	(15.75%)
Left area - Traced	16	(9.69%)
	<hr/>	
	165	

of patients who had been screened five years earlier. The findings are shown in Table XII. Here, too, a response rate of 50 per cent was found. Of those who failed to attend, it is observed that half of these gave no reason. Just under one-quarter of women could not be traced. This problem of inability to trace patients - is the main factor in lowering the response rate to recall after three years to the well-woman clinics in Dumfries and the peripheral clinics, Player, (1970). In spite of this a response rate of approximately 60 per cent has been achieved. The longer interval of five years would tend to increase the problem. It seems fashionable in the U. S. A. to have a "Pap test" carried out as part of an annual check-up so that these women should be easy to trace but the problem affects the response rate in the mass surveys, Erickson et al, (1956). Pedersen, (1966) observes the tendency in mass examinations for the attendance rate to drop markedly when examinations are repeated e. g. from 80 per cent on the first screening to 50 per cent or less on a second screening. Christoperson, (1970) found that older women, once recruited, tended to attend for recall more than the younger women.

As already observed, so far, only 13 women in my survey have failed to attend for rescreening after an interval of two to three years. The general practitioner has the tremendous advantage of being in continuous contact with patients and has less difficulty in tracing the ones who have moved. He has an opportunity to remind women about the test and persevere with persuasion of reluctant attenders. In my experience, once patients have returned for their second smear, which may have required a considerable amount of

persuasion, the subsequent recalls present no problems whatever and, in fact, many patients ask when their next smear is due.

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PART II

CHAPTER VI

DESCRIPTION OF CERVICAL CYTOLOGY SURVEY IN THE DALBEATTIE PRACTICE 1964-1970

The practice is centred in a country town in south-west Scotland of approximately 3,000 inhabitants with a surrounding rural area extending seven miles in radius in which a further 2,500 patients reside. It is a group practice with three doctors - one woman and two men - working in partnership. A health visitor/midwife and two R.G.N. nurses are attached. Two receptionists and one part-time secretary are employed by the practice. An appointment system has been in operation since 1966.

Aim of screening programme

It was decided by the partners that screening would be offered to all married women in the practice up to the age of 60 years. Single women would not be contacted but a smear taken if requested and clinically possible. A smear would be taken whenever a pelvic examination was being performed irrespective of age or marital status. Women who had had a total hysterectomy or amputation of the cervix prior to 1964 would be excluded from routine screening. Smears would be repeated every two to three years in accordance with area policy. Routine ante-natal screening is now also carried out. As the aim of the screening programme was directed at involving as many women as possible, it was decided to carry out a cervical smear only, although pelvic examination would be performed if clinically indicated. Similarly, it was

decided not to carry out routine palpation of breasts but this too, was carried out if requested or clinically indicated and patients are encouraged to practice self-palpation.

Recruitment of Patients

The initial approach was made to the local branch of the W. R. V. S. whose members nearly all belong to the practice; this produced an excellent and encouraging response. The opportunity was taken to speak to local assemblies of women e. g. at Church Guild and Rural Institutes meetings; this helped to promote interest in screening in the community and proved of value in aiding recruitment. Some patients had a smear taken at their own request. This was more common at the commencement of the survey and mainly applied to Social Classes I and II. By far the largest number of patients have been recruited by inviting them to come for a smear when seen in the practice either on their own account or in connection with their family. No patient is asked to wait longer than a fortnight to have the smear taken as it is considered very important that the interval between approaching the patient about having a smear taken and this actually being done should be as short as possible. In some cases the smear may be taken at the time of the initial approach if it is acceptable to the patient and if the doctor thinks it unlikely that she would keep an appointment. The purpose and desirability of cervical screening is discussed with patients at every opportunity by doctors, health visitors and nurses. It has been found that much persuasion is needed in some instances

especially among the older patients and those in the lower social classes. Once it was clear that cervical screening was proving itself to be acceptable and practicable in the practice a list of all women born between 1911 and 1950 was compiled and their marital and social state recorded and also any history of hysterectomy or amputation of the cervix. A comprehensive Age/Sex register of the practice was not compiled until 1966. This register is now used to identify the "eligible" patients and is kept up to date by the secretary so that new patients can be approached.

Recruitment has thus been achieved largely by personal contact. In an effort to obtain as complete a coverage as possible, a separate list of eligible patients who had not had a smear taken by October, 1970 was made up and each patient sent a letter - the first time this approach had been adopted - explaining the purpose and availability of cervical screening and an appointment given with instruction to contact the receptionist if not suitable so that a convenient one can be arranged. (Copy of letter in Appendix I). Some of these patients had not previously been contacted while others had refused or failed to keep an appointment. The response from the letter was poor but very good from those contacted for the first time. Routine screening of ante-natal patients commenced in the area in 1967. Initially, the ante-natal patients from this practice had the smear carried out when attending the hospital booking clinic but, towards the end of 1969, it was decided to take this in the practice as it facilitated record keeping and subsequent recall.

Organisation of the Clinic

The clinic is held weekly. At first, a whole afternoon was devoted to taking smears when approximately 30 would be taken in two to three hours. For the past three years, however, it has been found necessary to hold a weekly ante-natal clinic so that the two are now combined and the smears taken after the ante-natal patients have been examined. Patients who are unable to attend in the afternoon are given an evening or Saturday morning appointment. Both clinics are run by appointment. The health visitor/midwife assists at the clinic which is run by the woman doctor in the practice. The slides and forms relating to the smears are prepared in advance by the receptionists so that only the clinical details need be entered by the doctor; this saves valuable time. As stated earlier, pelvic examination is not carried out routinely. The smears are taken with Ayre spatulae and fixed with spray fixative. The slides are posted to the Pathology Laboratory of Dumfries Royal Infirmary.

The procedure differs for those patients on oral contraception. These patients have a full examination annually. This comprises weight and blood pressure check and urine testing; breast palpation; pelvic examination and cervical smear. Blood pressure and weight are checked at six-monthly intervals.

Due to the amount of work involved, it was agreed with regret, that it was not possible to inform each patient of the result of the smear. It is clearly explained that the results are received

from the laboratory within two weeks and if a "Non-negative" smear is reported, the doctor contacts the patient concerned. Any patient is at liberty to enquire the result from the doctor but, in fact, this rarely occurs. In some cases the doctor elects to inform the patient whatever the result; this is generally on account of obvious apprehension or if the smear is being repeated for some reason. Excellent cooperation exists with the gynaecologists and, if a cervical biopsy is indicated, the patient is admitted to hospital within approximately two weeks of being informed of the smear report. It goes without saying that any women who has symptoms or signs of genital disease warranting specialist investigation is referred in the usual way to the gynaecologist, irrespective of the result of the smear.

Arrangements for follow-up smears

A list of patients attending each clinic is filed in chronological order and this is used for recalling patients routinely every third year. One receptionist is responsible for seeing to this and posts appointments to the appropriate patients seven to ten days in advance. Patients' names are removed from the list when they leave the practice and a note is made if any patient is not to be recalled, e.g. if a repeat smear has been taken within three years. Routine recall is generally discontinued when a patient reaches 60 years of age. Non-attendance is recorded and it is left to the doctor to decide whether another appointment is sent or, as is more usual, the doctor contacts the patient to find out the reason for not attending and a further appointment is given them. This present system of recall, which functions very smoothly, may be altered if the proposed national computer recall scheme comes into force.

Patients on oral contraception are given an appointment when renewing their prescription one year after the last examination. A three or six months' supply of pills is usually prescribed so that the timing of the six-monthly and yearly checks are simple to arrange.

The N. H. S. record envelopes of those patients who have been smeared are marked by a tab of coloured tape; a different colour is used for each year. This is useful for record purposes and also when seeing a patient, as one knows at a glance when she last had a smear taken.

It is interesting to observe at this stage that the original arrangements for recruiting and carrying out the smears have not required to be altered other than including the ante-natal patients.

Analysis of response to recruitment and follow-up.

The practice list at December, 1970 has been selected for analysis of the response. The practice population, in keeping with the character of the whole area, is relatively stable - migration being estimated at less than 10 per cent per annum - so that these figures should be relevant to the study of the survey.

A total of 2,840 smears have been taken from 1,288 patients between March, 1964 and December, 1970. In Figure VI the 1,276 women born between 1911 and 1950 on the practice list at December, 1970 are grouped in quinquennia according to whether or not a smear has been taken. Those without smears are further divided into three categories: 1. Single, 2. Previous hysterectomy or amputation of the cervix and 3. Those for which there is no reason, henceforth termed "failures".

Of the 1,276 women aged between 20 and 59 years of age on the practice list, 918 (71.94 per cent) have had at least one cervical smear taken. Further analysis of the 358 women without smears

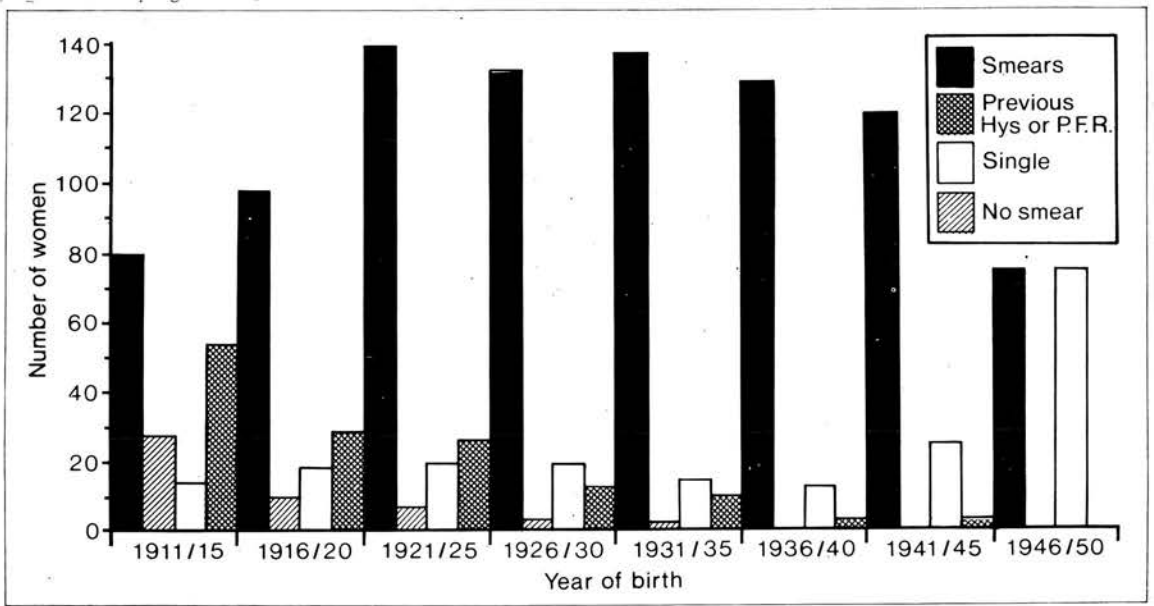


FIG. VI GROUPING OF THE 1276 WOMEN ON PRACTICE LIST BORN BETWEEN 1911 AND 1950

shows that 209 (16.38 per cent) are single and 29 (2.27 per cent) have had previous hysterectomy or amputation of the cervix. If these categories of women are excluded, it is found that 918 of 1,038 "eligible" women (88.44 per cent) have been recruited leaving 120 "failures" (11.56 per cent). Further study of Figure VI provides information about the age of the "failures". The percentage failure rate in each quinquennium is as follows:

1911-1915	39.40 per cent
1916-1920	21.60 per cent
1921-1925	9.60 per cent
1926-1930	7.60 per cent
1931-1935	6.75 per cent
1936-1940	2.20 per cent
1941-1945	1.60 per cent
1946-1950	0.00 per cent

It is observed that 70 per cent of the "failures" are aged 45 years and over. As will be seen when the analysis of this survey is compared with other screening projects, this high rate of failure among the older patients is a common feature.

The age-specific social status of the failures is shown in Table XIII. It is observed that the highest number of failures occurs among Social Classes IV and V. This is in keeping with the generally accepted fact that the poorest response in a screening programme is from the lower social classes. However, when one relates the failure rate by social class to the total age-specific

TABLE XIII

Social Status of 120 "Failures" in relation to age and social structure of the Practice.

Years	S.C. I & II			S.C. III			S.C. IV & V		
	No. of Women	No. of Failures	%	No. of Women	No. of Failures	%	No. of Women	No. of Failures	%
1911-15	29	7	(24.14)	38	14	(36.83)	65	33	(46.15)
1916-20	33	1	(3.33)	34	10	(3.4)	58	16	(27.58)
1921-25	33	2	(6.66)	43	3	(2.33)	80	9	(11.25)
1926-30	32	0	(0.00)	42	1	(4.44)	71	10	(14.03)
1931-35	22	1	(4.44)	45	2	(4.32)	81	8	(9.83)
1936-40	19	1	(6.21)	43	1	(4.16)	72	3	(4.16)
1941-45	20	0	(0.00)	21	0	(0.00)	82	1	(1.21)
1946-50	2	0	(0.00)	15	0	(0.00)	53	0	(0.00)
Total	190	12	(6.31)	281	31	(11.03)	567	77	(13.58)

TABLE XIV

Proportion of Failures by Social Class related to age specific failure rate.

Years	Age-specific Failure Rate (%)	Social Class I & II Failure Rate (%)	Social Class III Failure Rate (%)	Social Class IV & V Failure Rate (%)
1911-15	39.40	24.14	36.83	46.15
1916-20	21.60	3.33	3.4	27.58
1921-25	9.60	6.66	2.33	11.25
1926-30	7.60	0.00	4.44	14.03
1931-35	6.75	4.44	4.32	9.83
1936-40	2.20	6.21	4.16	4.16
1941-45	1.60	0.00	0.00	1.21
1946-50	0.00	0.00	0.00	0.00

failure rate, it is observed that the poor response is closely related to age. (Table XIV). The response from women aged 35 years and under differs little from the response from the other social classes. It appears therefore, that this relatively poor response in Social Classes IV and V is more a function of age than of social class per se.

It will be seen later that the response from the lower social classes is relatively good in this survey when compared with the response in other studies where social status is considered. It will be noted that the social classes in my survey have been placed into three, instead of the customary five, social classes. Considerable difficulty was encountered when trying to classify status from the husband's occupation which tended to alter with employment conditions. For example, a man may be a welder, and therefore, considered semi-skilled one month and yet be a labourer the next month. It is for this reason mainly that the upper and lower two categories are merged. The description of a husband's occupation can be misleading at times. A "Process Engineer" proved to be a man who wrapped boiler valves in polythene; a waste disposal officer turned out to be a road sweeper; it is noticeable that there are very few "labourers" nowadays! Table XV shows the effect of parity; it is seen that the response improves as parity increases and it is gratifying to note that there is 100 per cent recruitment of those with six or more children.

A. BY AGE GROUP

%

60

50

40

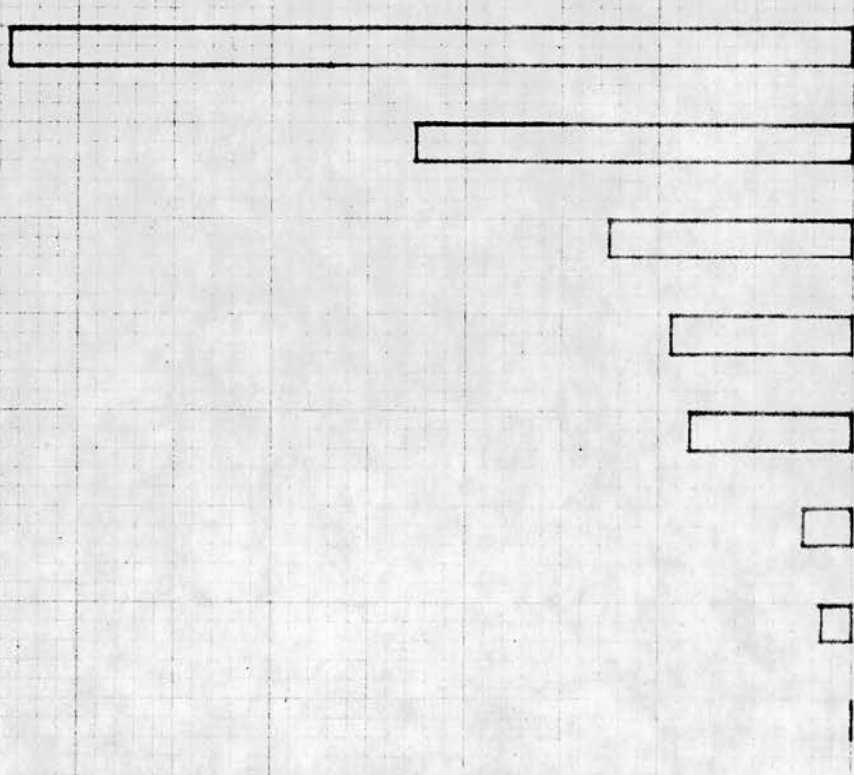
30

20

10

0

20-24 25-29 30-34 35-39 40-44 45-49 50-54 55-59
AGE GROUPS (YRS.)



B. BY PARITY

PARITY

0 1 2 3 4 5



C. BY SOCIAL STATUS

SOCIAL CLASSES

ICII III IV V

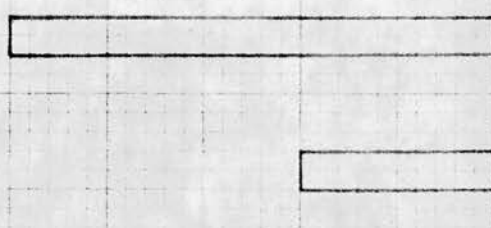


TABLE XV

PARITY OF 1038 MARRIED WOMEN ON LIST

Para	0	1	2	3	4	5	6	7	8	8
Smear	90	200	301	159	80	40	17	16	9	6
% Total	82.6	85.5	86.7	93.5	94.1	88.9				
No Smear	19	34	46	11	5	5	-	-	-	-
% Total	17.4	14.5	13.3	6.5	5.9	11.1	-	--	-	-

FIG. VII. DEPICTS THE ANALYSIS OF THE "REFUSERS" IN GRAPHIC FORM
The Problem of Non-Attendance

The main reason for non-attendance appears to be apathy rather than antipathy. That the poorest response is in the older age groups may be partly explained by the fact that these older women are much less conditioned to the concept of preventive medicine than the younger women who, it is hoped, will still continue to attend when they reach more mature years.

Pattern of Refusal

Patients express their unwillingness to attend in various ways. Some, but not many, refuse point blank while others faithfully promise to attend and then fail to keep the appointments. However, it is always worth while to keep persuading this type of non-attender as, with time, she very often attends - "I thought I had better come as I knew you would keep at me" is what is frequently said. At times I have found it useful to adopt the parliamentary procedure of "pairing" and it is a very efficient way of enlisting reluctant recruits. It is often difficult to elicit any reason for refusing to attend but the one most

commonly given is that if they had cancer, they would rather not know. There is no doubt that many people equate the mention of cancer with a sentence of death and much publicity is required to inform people of the curability of cancer if detected in its early stages. It is a pity that the term "cancer test" has become a synonym for a cervical smear. It is obviously important to stress the pre-cancerous nature of the condition sought. Another fairly common reason for refusal was that "there is no need to come because I feel perfectly well" or "I don't believe in that kind of thing". Occasionally a patient would say that she couldn't be bothered or that she did not have time. Very few openly expressed dislike of the thought of the test as their reason for refusal. It is quite remarkable how seldom people ask what the test involves; one woman, a Minister's wife made a point of brushing her teeth before she came! One woman said she wanted to come very much but her nerves would not allow her. It is observed from a personal knowledge of those who refuse to attend that some belong to the small group of aggressive or "difficult" patients in the practice. They are the ones who tend to disdain advice about losing weight, attending the dentist and bringing their children on first request for immunisation. It is felt that in this survey, the factor of personality is probably a more important reason for refusal than the more tangible ones of social status, and parity although age remains a significant factor. Inability to attend by reason of work is not valid in this survey, since, as has been said, it is always possible to arrange a suitable appointment. Very few of the women

on the practice list live away from home. The nurses have been kind enough to transport the few patients who cannot reach the clinic otherwise. On only one occasion has a smear been taken in the patient's home: it is considered to be much more satisfactory to bring the patient to the surgery where the light and examination could make smear-collection a simple procedure: struggling with a torch with a patient on a sunken mattress is by no means simple.

TABLE XVI

NUMBER OF SMEARS TAKEN IN EACH YEAR

YEAR (Up to March)	FIRST	FOLLOW-UP
1965	466	4
1966	215	9
1967	88	237
1968	50	364
1969	118	341
9 months up to Dec. 1970	351	237
TOTAL	1288	1192

TABLE XVII

Number of Smears for each patient on Practice List at
December, 1970

NUMBER OF SMEARS	NUMBER OF PATIENTS
1	279
2	170
3	420
4	39
5 and Over	10

TABLE XVIII
AGE, PARITY and SOCIAL STATUS of DEFAULTERS

Years	1911-15		1916-20		1921-25		1926-30		1931-35	
No of Women	2		3		3		4		1	
PARA	0	1	2	3	4	5	6	7		
No. Women -	1	4	1	2	2	1	2	-		
Soc. Status	I & II		III		IV & V					
No. Women	-		1		12					

Follow-up Smears

Only 13 of the 918 patients recruited have so far, defaulted from follow-up. The age, social status and parity of these 13 defaulters is shown in Table XVIII but, here again, personality is more important. Two patients expressed dislike of the test as their reason for not returning and one other was so worried, when asked to have a smear repeated (which proved negative) that she has since defaulted. The other ten women would give no reason; I was pleasantly surprised that they attended at all but naturally disappointed when they did not return. It is evident that the women who came at the commencement of the survey require little or no persuasion to return and many have been back for the third time. It remains to be seen if the women recruited latest and, therefore, by inference more difficult to persuade, co-operate so well in follow-up. It is my impression that quite a

few women have to be chased up to attend for their first follow-up but, from the second smear onwards attendance presents no problem. The original recruits have come to regard regular screening as part of life and it is hoped that this attitude prevails among the newer ones. Table XVI shows the number of first and follow-up smears taken in each year. The large number of new recruits in 1970 is mainly due to the drive to contact those who were still unscreened by that time and also to the inclusion of ante-natal patients. The number of smears per patient is shown in Table XVII.

The greatest care is taken to impress patients that the test is designed to detect cervical pre-cancer only and that they must report any untoward symptoms regardless if they have just had a test or not. This is emphasised at each visit. It will be seen later that many women are ignorant of the fact that they have had a smear taken; this would seem to be a sad and unnecessary failure in communication and would certainly not be conducive to future follow-up. A special cervical smear clinic has an advantage in this respect.

It seems unlikely that any of the 120 "Failures" will now be recruited unless there is occasion to carry out a pelvic examination. The new recruits will therefore come from those reaching the age when a cervical smear can be taken and is indicated. These young women are easily enlisted as a cervical smear may be taken as part of an ante-natal examination or in connection with oral contraception. Recruits will also be drawn from those women who are single at present and subsequently marry and from women coming into the Practice.

TABLE XIX

Cases of Carcinoma-in-situ of Uterine Cervix

Year	Pat.	Age	Para.	Husb.Occ.	S.S.	Abn. symp. or sign	Prev. NEG. Smear	Smear	T/ment	Foll. up
1964	P.S.	42	2	Butler	4	Nil	Nil	Pos.	Total Hys.	Nil
1965	M.T.	43	3	Separated	5	Menorr.	Nil	Pos.	Total Hys. R.Sal/Oop.	Removed 1970 Neg.
1965	G.M.	29	6	Labourer	5	Nil	Nil	Pos.	Total Hys. L.Sal/Oop.	1970 Neg.
1966	M.J.	51	2	Farm F/man	4	Nil	Nil	Pos.	Pan Hys.	1970 Neg.
1967	E.G.	35	1	Divorced	4	Erosion	1964	Pos.	Cone Biopsy +Rpt. smears	65-69 Neg.
1967	J.K.	31	2	Painter	5	Nil	1964	Susp.	Total Hys. R.Sal/Oop.	1970 Neg.
1967	E.L.	52	2	Gardener	4	Erosion	1964	Pos.	Total Hys. R.Sal/Oop.	1970 Neg.
1967	J.McD.	39	3	Build/Lab.	5	Nil	1964	Pos.	Total Hys.	1970 Neg.
1967	M.R.	56	1	Machinist	4	Nil	1964	Pos.	Pan Hys.	1970 Neg.
1968	M.B.	55	2	Reporter	3	Polyp	1966	Pos.	* Pan Hys.	1970 Neg.
1968	V.L.	43	4	School Mas.	1	Irreg. V. BL.	Nil	Pos.	* Pan Hys.	1970 Neg.
1968	I.B.	24	3	Labourer	5	Nil	1965	Susp.	Conisation (Ltd. C. I. S.)	Nil

* Evidence of residual Intra-epithelial carcinoma in Hysterectomy specimen.

INVASIVE CARCINOMA of UTERINE CERVIX

1965	M. McK.	43	2	Separated	5	Irreg. V. BL.	Nil	Nil	Mixed Adeno- Sq. Ca. R/Therapy	1969 Neg.
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CARCINOMA OF UTERINE BODY

1969	J.H.	57	2	Retired	4	Post Men. BL.	Nil	Neg.	Pan Hys.	
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Clinical Results of Cervical Screening

From the total of 1,288 women screened, 12 cases of Carcinoma-in-situ of the cervix have been detected. This gives a prevalence rate of 9.4 per 1,000 women screened. Details of the twelve cases are shown in Table XIX .

It is observed that the ages of the patients range from 24 to 56 years and that three of the patients were under 35 years of age when the lesion was detected. Ten of the patients belong to Social Classes IV and V, the remaining two belonging to Social Classes I and III. All the patients are parous.. Two of the patients were examined on account of irregular vaginal bleeding but the others were entirely symptom-free and the lesion detected on routine screening. The cervixes of the two patients with symptoms aroused no clinical suspicion; two patients in the symptom-free group were noted to have erosions of the cervix and another patient had a cervical polyp. Perhaps the most significant feature of these twelve cases of in-situ cancer is that seven patients had previously negative smears, and all these smears had been taken on screening for the first time. In six patients the smear had been taken 3 years prior to detection of the in-situ lesion and in the other patients the smear had been taken 2 years earlier. All these negative smears were reviewed by the Pathologist when the positive or suspicious smear occurred and in all cases there was no suspicion of abnormality. Whether the lesions had been missed on first screening or developed subsequently must be a matter for conjecture. If one uses the term "False Negative" to include not only

those instances where a smear has been wrongly interpreted but also those in which a lesion was possibly, or probably, present at the time of the negative smear. but the smear sampling was inadequate, then it could be postulated that some or all of these cases were examples of this second type of false negative. Jordan, (1969) contends that, although some of the positive smears are passed as negative by the cytologist, just as many are reported negative because the clinician taking the smear has failed to take an adequate smear in the first place, or has failed to ensure a good fixation. Five of my patients who were found to have an in-situ lesion on second screening had their first smear taken in the first year of the survey so my inexperience in the technique of smear-collection must be taken into account. It seems paradoxical that, if experience in the technique of smear-collection is an important factor, as this increases in my survey case-finding diminishes. It is observed that no cases of carcinoma-in-situ have been detected amongst the 479 first smears and 578 repeat smears in the last two years of this screening survey. The only difference between these two years and the preceding ones is that there has been an increasing number of younger women enlisted among the ante-natal patients: this is unlikely to have had any significant effect on the total age pattern of first smears over these two years and does not apply to the repeat smears. Macgregor et al., (1971) quote instances of both types of false negative smears in their review of eight cases of invasive cervical cancer in which a previous smear had been negative. In one case it was found that malignant cells had been missed in the smear taken five years previously and

and reported as negative at that time. One patient who had a negative smear two years prior to presentation with invasive cancer was found to have a lesion high up in the endocervical canal. It is understandable that a lesion in this site, remote from the spatula, may go undetected. Two patients had had a vaginal smear taken eight years prior to the detection of invasive cancer and had subsequently defaulted from the follow-up. It was thought probable that the lesion had been missed at the time of the first smear in both these patients. The apprehension and tension experienced by many women on the occasion of their first cervical smear may affect the quality of this smear in that the cervix may be difficult to visualise and thus result in the smear not being taken from the squamo-columnar junction. It is noticeable how much more relaxed a patient is when she returns for a subsequent smear. My findings would support the contention of Garrett, (1964), Dunn, (1966) and Jordan, (1969) and others who emphasise the fallibility of the first smear and, for this reason, recommend that rescreening should be repeated in one year and thereafter in accordance with the agreed interval for rescreening pertaining in the area.

All but two of the patients have had a total hysterectomy after confirmation of the lesion by cone biopsy. Residual carcinoma-in-situ was reported in the operation specimens from cases 2, 3 and II (see TableXIX). Two patients have been treated conservatively. One patient, (case 12), aged 24 years and with three children was found to have a limited lesion on cone biopsy. It was decided therefore, to regard this as sufficient treatment for the present but to have

regular follow-up smears taken. Unfortunately, the patient has left the district but she was well impressed on the necessity for regular follow-up and her records prominently endorsed to this effect. The other patient, (Case 5), aged 35 years and with one child, was recently divorced from her first husband and about to remarry. She was anxious to have a further pregnancy therefore conservative treatment by conisation of the cervix and regular follow-up was recommended. A child was born by elective Caesarean section two years after the detection of the in-situ lesion and all subsequent smears have been negative. Nine of the patients treated by hysterectomy have had negative vaginal smears on follow-up. Originally, it had been agreed that patients treated by hysterectomy would not be re-screened because of the possible psychological upset this might produce. However, on account of the risk of recurrence, or development of a new lesion, in the vaginal vault, it was later decided that these patients should be followed up regularly. It is pleasing to report that none of the nine patients objected to being asked to return and accepted the explanation that the test was to make sure that all was well. The possibility of recurrence was not mentioned to the patient.

One patient left the district shortly after hysterectomy so was not followed-up here.

During the period of this survey, two cases of invasive cervical cancer were discovered. One patient, aged 43 years, para 2, S.S. 4 and separated from her husband, had post-menopausal bleeding and was referred direct to the gynaecologist in view of the clinical

suspicion of carcinoma and did not have a smear taken - she was seen at home and I had no equipment with me for taking a smear. Biopsy confirmed a mixed squamous-adenocarcinoma of the cervix. She was treated by radiotherapy and remains well five years after treatment. The other patient, a woman aged 52 years, para 2, Social status 5, complained of a blood-stained vaginal discharge and on examination was found to have an extensive fungating lesion of the cervix. She was treated by radiotherapy but died two years later from widespread metastases.

One case of carcinoma of the body of the uterus occurred during this period. The patient, aged 57 years, para 2 and S.S. 4, had post-menopausal bleeding. This cervical smear was negative.

Non-malignant Abnormalities

Cytological Abnormalities

Twenty-one patients have been followed up because of abnormal smear appearances. In five, the smear was reported "positive". In three of these the biopsy showed squamous metaplasia, a condition in which the proliferating reserve cells show squamous differentiation. Annual smears were recommended and this has been carried out and each patient has since had three negative smears. The biopsy on one patient showed chronic Cervicitis and the biopsy of the fifth patient showed dysplasia. A repeat smear six months later was negative as was the one taken after one year. In ten patients a "suspicious" smear was reported. Three showed squamous Metaplasia, and repeat smears were advised. All of these were reported as Negative and

follow-up smears have been consistently negative. Two showed evidence of dysplasia and, after repeating the smear on receipt of the suspicious report, further smears after an interval of six months were advised. Both of these and subsequent annual smears have remained negative. Three others showed evidence of inflammation and the subsequent follow-up smears were negative. One patient was on oral contraception and the atypical appearance of the smear was considered to be due to this. The tenth patient left the district before the suspicious report was received. She is separated from her husband and leading a peripatetic existence, hence the inability to trace her. Six smears were reported negative but with atypical cells. Repeat smears were requested and these were reported negative. Two were associated with a Trichomonal infection. One of the smears which showed slight Dyskaryosis was from a patient on oral contraception.

Cervical Polypi

Polypi have been observed in twenty-two patients all of whom have been referred to the Gynaecological clinic. Avulsion of the polyp and subsequent curettage of the uterus has been performed. In only one case was the polyp associated with intra-epithelial carcinoma.

Erosion of Cervix

Erosion of the cervix, manifested by a scarlet granular appearance affecting all or only a localised area of the external Os, was recorded in 127 patients. None of these was associated with symptoms but two of the patients in whom in-situ cancer was detected were noted to

have eroded cervixes. Many erosions appear to heal spontaneously as subsequent screening reveals a cervix of normal "healthy" appearance; others, however, are observed to persist when rescreening is performed. Treatment is not advised if the patient is symptom-free and the clinical appearance of the cervix considered to be benign but some cases, particularly if there is evidence of infection or if there is any doubt about the innocence of the appearance, are referred to the Gynaecologist and cauterisation of the cervix carried out, if considered advisable. The presence of an erosion or any feature such as the presence of a polyp or that the cervix bleeds easily is recorded on the cytology form and also on the patient's N.H.S. record for future reference. Kroll (1970) observed 279 cervical erosions in 1,808 women examined at a Well-woman clinic over a period of six years. Of the 173 which were followed up at six-monthly intervals, it was found that approximately 39% healed spontaneously within one year, 31% responded to medical treatment, 17% healed only after surgical treatment, 9% remained unhealed when reviewed six months after the last active treatment and 4% relapsed after originally healing well. In this survey nine patients had cervical carcinoma, confirmed by biopsy and in eight of these patients a cervical erosion was present. As a result of their experience with Colposcopy, Coppleson and Reid (1967) postulate that clinically alleged erosions are not in fact true erosions. They consider the appearance is due to one of several changes such as the presence of ectopic columnar epithelium or physiological squamous cell metaplasia.

Trichomonal infection

The presence of this infection was recorded in 79 patients the majority of whom were symptom-free. Treatment which, in most cases consisted of a week's course of Metronidazole, was prescribed whenever this infection was reported.

Monilial infection

This infection was reported in 24 patients. In this survey it has not been found to be more frequent in those women on oral contraception.

An analysis of cases of Carcinoma-in-Situ, Invasive Squamous carcinoma and Adenocarcinoma of the Cervix detected by exfoliative cytology in the Dumfries area in 1968 to 1970 is depicted in Table XX. It is observed that the age of patients with carcinoma-in-situ ranges from 21 to 72 years. All the women were parous except for one single patient - the other three single women were all parous - Unfortunately, it is not known how many cases of carcinoma-in-situ were detected on first or repeat screening. Three of the 12 cases detected in 1968 were patients of mine. Two of these had had one previously negative smear and the other case was detected on the first smear. None of the 21 patients found to have invasive cancer had been previously screened. These patients come mainly from the older age groups which are less well-represented in the "screened" population.

TABLE XX

Analysis of Cases of Carcinoma-in-situ, Invasive Squamous Carcinoma and Adenocarcinoma of
Uterine cervix detected by Exfoliative Cytology, Dumfries Pathology Laboratory Area, 1968-1970.

CARCINOMA-in-SITU

Year	No. Cases	Age	Civil State (MWD Sep.)	S.	NK	0	1+	NK	Smear		Gyn.	Source			
		Range Yrs.							Pos.	Susp.		AN	FP	GP	WW
1968	39	21-72	38	1	-	-	26	3	23	11	9	2	-	12	16
1969	13	23-59	12	1	-	1	11	1	3	5	2	4	-	1	6
1970	19	22-62	17	2	-	-	13	1	10	9	6	-	3	3	7

INVASIVE SQUAMOUS CARCINOMA

1968	11	22-65	11	-	-	-	10	1	9	2	7	-	-	3	1
1969	4	62-70	2	2	-	2	2	-	3	1	3	-	-	1	-
1970	6	45-72	3	1	-	1	4	1	6	-	5	-	-	1	-

ADENOCARCINOMA

1968	0		3												
1969	3	55-72	3	-	-	-	2	1	3	-	4	-	-	-	-
1970	2	63-69	2	-	-	-	1	1	2	-	2	-	-	-	-

COMPARISON OF RESPONSE TO RECRUITMENT AND CLINICAL RESULTS
IN OWN SURVEY WITH OTHER REPORTED SURVEYS CONDUCTED IN
GENERAL PRACTICE AND BY LOCAL HEALTH AUTHORITIES.

An analysis of the response to recruitment is shown in Table XXI

It is observed that a response rate is quoted from one Local Authority survey only. This is understandable as the Well-Woman clinics are run mainly on the "Open-door" principle and do not attempt to cover a defined population as in a comprehensive survey conducted in General practice. The survey carried out by MacTaggart in Dartmouth was exceptional in that it was aimed at the entire female population aged between 25 and 60 years in the area and achieved an excellent response. It is observed that a very high rate of recruitment is attainable in General Practice surveys. The report by Macgregor et al., (1971) of the coverage of 97.3 per cent of the female population under 60 years of age in the City of Aberdeen after ten years of screening is truly remarkable and is just a reward for the efforts expended. The coverage includes smears taken from all sources and the patients recruited from general practice were invited by letter, signed by their own doctor, to attend a clinic which was conducted by a member of the Cervical Cytology Department in Aberdeen. Apart from a letter, the verbal encouragement of the patient's own doctor greatly enhanced the response. The poorest response in the surveys quoted is in Ashworth's where women were invited by letter only. In all other surveys a combination of methods of recruitment was employed and it is evident that this proves most effective. The very high recruitment rate obtained by Lawrence in his practice is all the more commendable since the majority of the women were drawn from the most resistant social classes;

TABLE XXI

Analysis of Response to Recruitment

Survey	Selected Age Gp. (yrs.)	No. of Women Available	No. of Women smeared	%	Method of Recruiting	Social Status
<u>G.P. Surveys:</u>						
Wookey 66-70	25-64	2294	1507	65.6	Poster Letter Personal	N/S
Kroll 63-68	20-59	3385	1808	53.4	Pamphlets Pelvic:A/N Exams Personal	N/S
Lawrence 63-67	"At Risk"	774	700	90.4	Poster Pelvic:A/N Exam Personal	Mainly S. Cs. IV & V
Ashworth 66	25-55	1774	665	37.0	Letters	All Classes
Collinson 67-69	35-60	556	393	80.7	Letters P/N Exam. Request	N/S
Newmark 64-65	35-50	323	230	77.0	Letter H. V. visit Pelvic Exam.	High Prop. S. Cs. IV & V
Rose 64-70	Under 60	1088	913	83.4	Personal Pelvic:A/N Letter	All Classes
Macgregor 60-69	Under 60	42994	41344	97.3	Letters X 3 Personal	All Classes
<u>Local Authority Survey</u>						
MacTaggart 66-67	25-60	1320	1033	86.8	Letter HV visit Local Press	All Classes

personal contact is facilitated by the relatively small number of women "at risk".

A certain amount of confusion in the interpretation of the term "Positive" results is reflected by the variation in the "Prevalence" rates quoted in several surveys depicted in Table XXII and XXIII.

In some cases, all positive smears constitute the cited Prevalence or "Pick-up" rate while, in others, the rate is restricted to cases of carcinoma-in-situ or to all forms of cervical cancer detected. It is for this reason that the rate of Positive smears and cases of cervical cancer detected are shown separately in Tables XXII and XXIII. It will be observed that the two rates can vary considerably as instanced by the findings in my own survey and those of Lawrence and Grant. The analysis of the histological diagnosis by smear diagnosis (Table XXIV) serves to illustrate the fallacy of basing a rate on positive smears as opposed to proven histological condition. It is seen that approximately one-fifth of the positive smears reported in the W.R.H. B. area in 1969 and 1970 were shown histologically to be associated with conditions other than cervical cancer.

A truer comparison can therefore be drawn from a study of prevalence rates for cervical cancer only. In spite of this restriction, a marked variation in the prevalence rate shown in the surveys in Tables XXII and XXIII is observed - from 1.9 to 34.7 per 1000. It is

TABLE XXII

Analysis of Positive Findings

Survey	Age S Group	Social Status	No. of Smears	No. of Positive Smears	Rate per 1000	C.I.S.	M/I	Inv. Ca	Rate of CIS, MI, Inv. Ca/1000
<u>General Practice Surveys</u>									
Wookey									
66-70	25-64	N/S	1507	8	6.3	7	1	-	6.3
Kroll									
63-68	20-59	N/S	1908	12	8.9	9	-	3	8.9
Collinson									
67-68	35-60	N/S	393	2	5.6	2	-	-	5.6
Hodes	35-39								
66-67	mainly	N/S	1202	7	5.8	"Neoplasms"			
Lawrence		IV. V.							
63-67	"At risk"	mainly	700	14	20.0	11	-	-	13.7
Newmark		IV. V.							
64-65	35-50	mainly	230	8	34.7	6	1	1	34.7
Hendry									
66-67	45-46	N/S	100	3	30.0	3	-	-	30.0
Lloyd	Pelvic								
64-45	Exam.	N/S	167	3	15.2	3	-	-	15.2
Rivett	Pelvic								
64	Exam.	N/S	141	1	9.1	1	-	-	9.1
Coll. GP	Pelvic								
SE. Scot.	Ex/P/N	N/S	1000	15	15.0	11	-	4	15.0
Rose	Under								
64-70	60	All	1233	17	13.8	12	-	-	9.4
Macgregor									
et. al.	Under								
60-69	60	N/S	41844			313			7.4

TABLE XXIII

Analysis of Positive Findings

Survey	Age Group	Social Status	No. of Smears	No. of Positive Smears	Rate per 1000	C.I.S.	M/I	Inv. Ca.	Rate of C.I.S, M.I, Inv Ca/1000
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Local Authority Surveys

Davey et al. 68-69	N/S	I, II, III	1768			8	-	-	4.5
Grant 66-67	35-44 mainly	IV & V	1661	38	22.9	19	7	-	15.0
Parry et al. 66-70	ALL	III, IV & V	17142	148	8.6	113	-	23	7.9
MacTaggart et. al. 66-67	35-60	ALL	1033	2	1.9	2	-	-	1.9
Hall et. al. 65-66	20-60	ALL	2160	15	6.9	15	-	-	6.9
Sansom et. al. 65-71	ALL	ALL	257004	2697	10.5				
Osborne et al. 64-65	ALL	III mainly	1635	12	7.3				
65-66	N/S	III, IV & V	753	20	26.5				
Donaldson one week	N/S	N/S	1369	8	5.8				
Davies et al. 65-70	20+	N/S	45525	415	9.1	231	31	100	7.5
Dumfries W. W. Clinic 65-70 (Brown 1971)	20-60	ALL	6661	36	5.4				

noted that the rate in ten of the surveys falls within the generally quoted prevalence rate of 5 - 10 cases of carcinoma-in-situ per 1000 screened, on the first screening. The overall prevalence rate of 9.4 per 1000 women screened in the survey is based on the results of both first and repeat screening. The low rate of detection reported by MacTaggart et al., (1968) is based on a finding of 2 cases in 1033 women examined. This low rate is somewhat surprising since 65 per cent of the smears were obtained from women aged 40 years and over. The social class of the women is not stated but it is likely that the majority of the population would belong to the upper social classes and this could reduce the expectation of cases of cervical cancer. The high detection rate of 8 cases of in-situ cancer out of 230 women examined by Newmark, (1966) may be explained by the fact that coverage was concentrated on women aged 35 to 50 years of age and that they were drawn mainly from social classes IV and V. The small number of women involved in this survey and those of Lloyd, (1967) and of Hendry, (1968) where 3 cases of in-situ cancer were detected in 100 women aged 45 and 46 mainly, diminishes the significance of these findings. The discovery of 11 cases of in-situ cancer in 700 women tested by Lawrence, (1968) may be attributed to the fact that nearly all the women tested belonged to social classes IV and V thus confirming the expectation of a high rate. There seems no obvious explanation for the high rate of 15 cases of in-situ cancer per 1000 women examined found by the S.E. Scot. Faculty of College of G. Ps. in Edinburgh in 1955. The

social status of the women is not stated but the groups from which the women were selected viz. all women who came for post-natal examination, women with menopausal problems but without histories of genital disorder and women where complete medical examination was indicated or in connection with contraceptive advice, are representative of a well-woman population of any practice. A feature of this study was the relatively high incidence, (20 per 1000) of cases of in-situ in the post - natal group.

The high prevalence rate of cervical cancer quoted by Grant (1968) is a good illustration of the value of concentrating screening on women in Social Classes IV and V. In his survey in Dundee, the clinic was purposely sited to attract these women and the resultant yield of cancer cases completely vindicates the difficulty and doubt expressed about holding such a clinic. The survey of Osborn et al, (1966) where a domiciliary smear-collection service for women in social classes IV and V was carried out also demonstrates the rich source of case-finding in this group of women. In this survey a prevalence rate of positive smears of 26.5 per 1000 was obtained compared with a rate of 7.3 per 1000 in a survey conducted a year earlier among mainly social class III women.

The majority of cases of cancer were detected among the women screened incidentally in surveys where this factor is discussed but most make no reference to this. It is noted that in many of the Local Authority studies there is no information on the outcome of follow-up of the positive smears; the responsibility of the Local

Authority ends once the patient's general practitioner has been informed of the positive smear. This break in continuity is one of the arguments against screening outwith general practice. None of the surveys make any mention of the results of follow-up screening although some patients must have already been recalled in those surveys working on a two-three year recall basis.

The histological diagnosis by source of smear collection in the W.R.H.B. area is shown in Table XXV. It is seen that the Gynaecological clinics, as one would expect, are the most productive single source of cases of cervical cancer but that all sources contribute to the total cases detected during the two years under review. The incidence rate of cases of cervical cancer detected in the Dumfries area in 1969 and 1970 is shown in Table XXVI. It is observed that the pattern of incidence rate from the various sources varies in the two years. It is clear however, that all sources are potential contributors to case-finding.

An analysis of age specific prevalence rates for positive smears is shown in Table XXVII. It is seen that there is a steady rise in prevalence of positive smears as age progresses but that the peak prevalence varies in the surveys. It is noted that a considerable number of cases are detected in women under 35 years of age. The small numbers in my survey demonstrate how misleading these can be when translated into terms of 1000 cases. Unfortunately in the histological diagnosis of the positive smears in the first three surveys is not known. One cannot determine therefore, whether

TABLE XXIV

Histological Diagnosis by Smear Diagnosis, W.R.H.B. Area, 1969 and 1970.

Smear	Normal Epith.	Benign Changes	Dysplasia	Ca-in-Situ	Inv. Sq. Ca.	Adeno-Ca.	Other	Total
Negative	4	11	1	-	2	-	3	21
Unsatisf.	1	1	1	-	1	-	-	4
Suspicious	31	179	119	102	50	18	23	522
Positive	3	13	48	195	141	23	22	445
Total	39	204	169	297	194	41	48	992

TABLE XXV

Histological Diagnosis by Type of Clinic, W.R.H.B. Area, 1969 and 1970.

Source	Normal Epith.	Benign Changes	Dysplasia	Ca-in-Situ	Inv. Sq. Ca.	Adeno-Ca.	Other	Total
Gyn.	25	160	100	174	164	40	37	700
A/N) P/N)	1	5	10	21	5	-	1	43
F.P.	-	6	6	12	1	-	2	27
G.P.	1	15	15	33	12	1	4	81
W.W.	12	18	36	55	12	-	4	137
Spec. Clinic	-	-	2	2	-	-	-	4
Total	39	204	169	297	194	41	48	992

TABLE XXVI

Incidence of Carcinoma-in-Situ, Invasive Squamous Carcinoma and Adenocarcinoma by Source,
Dumfries Area, 1969 and 1970

Year	Source	Carcinoma-in-Situ		Invasive Sq. Ca.		Adenocarcinoma	
		$\frac{\text{No. Cases}}{\text{No. Smears}}$	Rate/ 1000	$\frac{\text{No. Cases}}{\text{No. Smears}}$	Rate/ 1000	$\frac{\text{No. Cases}}{\text{No. Smears}}$	Rate/ 1000
1969	Gynae.	$\frac{2}{872}$	2.3	$\frac{3}{872}$	3.6	$\frac{4}{872}$	4.6
	A/N	$\frac{4}{1467}$	2.7	$\frac{0}{1467}$	0.0	$\frac{0}{1467}$	0.0
	F.P.	$\frac{0}{193}$	0.0	$\frac{0}{193}$	0.0	$\frac{0}{193}$	0.0
	G.P.	$\frac{1}{579}$	1.7	$\frac{1}{579}$	1.7	$\frac{0}{579}$	0.0
	W.W.	$\frac{6}{2081}$	2.9	$\frac{0}{2081}$	0.0	$\frac{0}{2081}$	0.0
1970	Gynae.	$\frac{6}{880}$	6.8	$\frac{5}{880}$	5.6	$\frac{2}{880}$	2.3
	A/N	$\frac{0}{1349}$	0.0	$\frac{0}{1349}$	0.0	$\frac{0}{1349}$	0.0
	F.P.	$\frac{3}{361}$	8.3	$\frac{0}{361}$	0.0	$\frac{0}{361}$	0.0
	G.P.	$\frac{3}{636}$	4.7	$\frac{1}{636}$	1.6	$\frac{0}{636}$	0.0
	W.W.	$\frac{7}{1161}$	6.0	$\frac{0}{1161}$	0.0	$\frac{0}{1161}$	0.0

TABLE XXVII

Age specific Prevalence Rate for Positive Smears quoted in four Surveys

Years		20	20-24	25-34	35-44	45-54	55+
Survey							
Davies et al.	Total smears	411	3302	11982	13715	10299	5816
	Pos. smears No.	1	15	97	138	100	64
	Rate/1000	2.4	4.5	8.1	11.0	9.7	11.0
Grant	Total smears	-	68	600	631	279	81
	Pos. smears No.	-	-	15	13	8	2
	Rate/1000	-	-	25.0	20.6	28.6	24.7
Parry et al.	Total smears		1569	5119	5652	3675	1023
	Pos. smears No.		4	41	68	37	5
	Rate/1000		2.5	7.2	10.97	9.5	4.88
Rose	Total smears	58	75	252	276	239	80
	Pos. smears No.	-	2	2	7	3	3
	Rate/1000	-	27.0	7.9	25.3	12.6	37.5

or not the observation of Ashley (1966) that the prevalence of carcinoma -in-situ falls after 40 years of age obtains. The prevalence of benign conditions affecting the genital tract is a feature of many surveys. Cervical erosions were noted frequently; the majority of these appeared to be symptomless. Kroll (1970) quotes a prevalence rate for cervical erosions of 15.8 per cent in her survey of 1808 women. It was noted that approximately 40 per cent of these erosions healed spontaneously within one year and this behaviour confirms the impression of other workers. Cervical polypi are also frequently encountered. A prevalence rate of 5 to 15 per cent is quoted for *Trichomonas vaginalis* infection which may be associated with an abnormal smear. Many of these infections appear to be symptomless. Infection with *Candida Albicans* is less commonly recorded, none of the surveys comment on any particular association with oral contraception.

Other abnormalities mentioned include the presence of uterine fibroids, prolapse and cervicitis; many women tolerate a considerable amount of discomfort as a result of these conditions yet fail to seek medical advice. The detection and subsequent treatment of such conditions is a most worthwhile side benefit of screening and earns much appreciation from patients so helped.

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DESCRIPTION OF THE CERVICAL CYTOLOGICAL SERVICES IN THE
AREA OF THE PATHOLOGY LABORATORY OF DUMFRIES AND
GALLOWAY ROYAL INFIRMARY AND AN ANALYSIS OF THE
CONTRIBUTION FROM THE SOURCES OF SMEAR COLLECTION.

The total population of the area amounts to approximately 145,000 persons. The estimated population of females aged between 15 and 59 years in the area in June, 1970 was 40,300 (Registrar General). It is calculated on the basis of the crude national percentages of marital condition that there were 29,300 "Ever-married" females aged between 15 and 59 years in the area in June, 1970. The term "ever-married" refers to all married, widowed, divorced and separated women.

There are three counties in the area. The estimated population of the County of Dumfries in June 1970 was 91,000 persons of whom 29,500 resided in the Burgh of Dumfries. The other two counties - Kirkcudbrightshire and Wigtownshire - are collectively known as Galloway and contained 23,000 and 31,000 persons respectively in June, 1970.

All cervical cytological specimens are sent to the Pathology Laboratory of Dumfries and Galloway Royal Infirmary. The laboratory staff employed in cervical cytology in 1970 consisted of one Consultant Pathologist, one junior Registrar, one senior and three junior screeners. All this staff take part in the total work of the Pathology laboratory as well as dealing with cervical cytology.

The Gynaecological Department of Dumfries and Galloway Royal Infirmary is staffed by three Consultant Gynaecologists, two Registrars and one Senior House Officer. There are 21 beds in the Gynaecology



Hosp. Gynae. Clinics

- Dumfries
- Moffat
- Castle Douglas
- Newton Stewart
- Stranraer

Hosp. Ante-natal Clinics

- Dumfries
- Moffat
- Langholm
- Annan
- Kirkconnell

L.A. Well-Woman Clinics

- Dumfries
- Moffat
- Annan
- Langholm
- Kirkconnell
- Lockerbie

- Castle Douglas
- Kirkcudbright
- Gatehouse
- Creetown
- Newton Stewart
- Stranraer

F.P.A. Clinics

- Dumfries
- Annan
- Langholm
- Kirkconnell
- Newton Stewart
- Stranraer

Ward in the Infirmary and 12 beds in Castle Douglas Cottage Hospital are reserved for Gynaecological patients. Gynaecological Out-patients Clinics are held at Dumfries and Galloway Royal Infirmary and at peripheral clinics held at Garrick Hospital Stranraer and the Cottage Hospitals in Newton Stewart, Castle Douglas and Moffat, (see Fig. VIII) A cervical smear has been a routine part of pelvic examination in these clinics and wards since 1951. Ante-natal Clinics for patients wishing to be confined in Cresswell Maternity Hospital, Dumfries and at Clenoch Maternity Hospital, Stranraer are held in the Hospitals and at seven peripheral clinics. Cervical smears have been a routine part of ante-natal examination in this area since 1967. Approximately 95 per cent of women are now confined in Hospital in this area. The birth rate in the area in 1970 was 15.6 per 1,000 persons.

The first local authority Well-woman clinic in the area was opened in Dumfries Burgh in April, 1965 and peripheral clinics were opened within the following year in five burghs in the county of Dumfries. Four Well-woman clinics in Kirkcudbrightshire and two in Wigtownshire commenced at the same time. Two doctors are on the staff of Dumfries burgh clinic and the others all have one doctor. All the doctors are female. Pelvic and breast examination is carried out in addition to the taking of a cervical smear. The clinics are open to all women and are advertised in the local press and in Welfare clinics. Patients are recalled every three years. Family Planning advice has also been available at these clinics since 1968.

The Family Planning Association hold clinics in Dumfries burgh and five peripheral clinics in the three counties.

GENERAL PRACTITIONER PARTICIPATION IN CERVICAL CYTOLOGY IN DUMFRIES & GALLOWAY

There are 45 practices and a total of 84 doctors in the Executive Council areas of Dumfries and Galloway. 1,154 Smears were submitted from 30 of the practices during 1970 giving an overall participation rate in the area of 66 per cent. The rate varied within the region in that 11 of the 22 practices in Dumfries Executive Council area participated compared with 83 per cent of the practices in Galloway.

Certain differences emerge when one studies the response from the various parts of the region.

Dumfries Burgh

Smears were sent from two of the five practices comprising a total of eighteen doctors. One doctor in a 4-doctor practice of 8,134 patients submitted 94 smears in 1970 and 3 doctors from a 5-doctor practice of 12,604 patients sent 9 smears. The total contribution from the Burgh in 1970 was thus 8.8 per cent of the total for the area.

Dumfries County

Three of the eight single-handed practices sent a total of 22 smears during 1970. The highest individual total was from the only single-handed female doctor who submitted 17 smears from a practice list of 1527 patients. Four of the two-doctor practices took 63 smears in that year and one doctor of the three four-doctor practices sent 12 smears. The number of smears from the county in this year was thus 8.5 per cent. of the total for the area.

Galloway

Eight of the 12 single-handed doctors in the area sent a total

of 65 smears. All of the nine two-doctor practices participated and sent a total of 307 smears during 1970. The two three-doctor practices sent a total of 582 smears representing 51.3 per cent of the total number of smears submitted from the entire area in 1970. In that year 446 smears were sent from my own 3-doctor practice; this represents 38.6 per cent of the total for the area.

It is shown in Table XXVIII that 384 of the smears submitted were from 26 practices sending 60 or less smears during the year and that this represented one-third of the total from the area in 1970. The remainder were received from four practices taking from 94 to 446 smears for the year.

The five practitioners aged 35 years and under in Galloway were responsible for 131 of the 307 smears from this region but it is observed that the older doctors are also represented. There are two Health Centres in the area. The doctors from one Centre consisting of 9 doctors sent a total of 80 smears while none were sent from the other Centre in which three doctors practice. There was no difference in the pattern of participation between single-handed and partnership doctors. Four women doctors practice in the area. Two of these did not submit any smears, one sent 17 smears and my contribution was 446 smears in 1970.

It is evident that the doctors practising in the vicinity of Local Authority Well-woman clinics tend to refer their patients to these clinics in preference to taking the smears themselves. This accounts for the relatively poor performance from the doctors in Dumfries

burgh and county where six very active clinics are situated.

Although the above observations refer to 1970 only, I am assured by the Pathologist that they are representative of the pattern that has developed since cervical cytology became available to general practitioners in 1964. One concludes from these observations that the majority of doctors in the area are prepared to take smears and, those who do not, advise their patients to attend a local Well-woman clinic. There is no evidence of comprehensive screening of a practice population other than my own. The extent of participation would appear to depend on the inclination of the individual doctor rather than the type of practice to which he belongs.

TABLE XXVIII

Number of smears submitted by General Practitioners in Dumfries and Galloway in 1970.

Number of Smears	Number of Practices	Total Number of Smears	% of Total Smears
1 - 9	12	59	5.12
10 - 19	7	103	8.84
20 - 29	3	62	5.33
30 - 39	3	110	9.49
40 - 49	-	-	0.00
50 - 59	1	50	4.33
60+	4	770	66.89
(94)			(8.15)
(94)			(8.15)
(136)			(11.95)
(446)			(38.64)
Total	30	1154	100.00

Analysis of participation in Cervical Screening and of the pattern of smear-collection from different sources in Dumfries Pathology Laboratory Area, 1965 to 1970.

The number of first cervical smears submitted to Dumfries Pathology laboratory for the years 1965 to 1970 is shown in Table XXIX.

TABLE XXIX

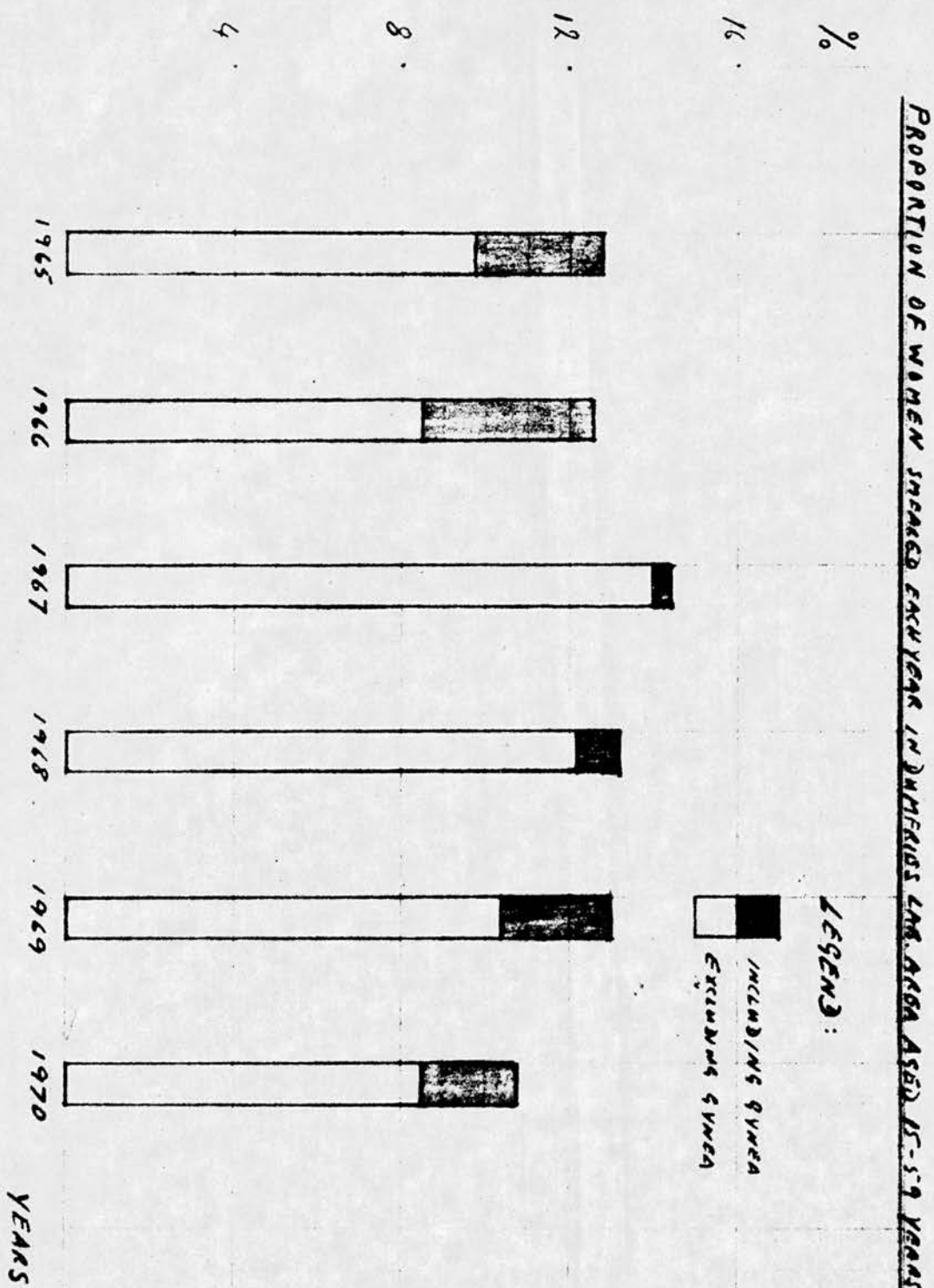
NO. OF FIRST CERVICAL SMEARS, DUMFRIES PATH LAB AREA,
1965 - 70

Source	No. of First Smears	No. of Women aged 15-59 years. in area	% "smeared"
Gynae	6406	40300	15.9
Non-Gynae	25850	40300	64.1
Total	32356	40300	80.0

It is evident therefore, that after six years in which cervical screening has been available in the community, a very high overall participation rate has been achieved. It will be interesting to see if the 97.3 per cent coverage of the female population under the age of 60 years in the City of Aberdeen can be approached in this area by the end of another four years.

The percentage of the population examined in each year is shown in Fig IX . It is seen that the maximum proportion in any one year occurs in 1967. By this date, cervical screening had been available to general practitioners for four years and Well-woman clinics were in their third year of operation. The steady decline observed since 1967 is understandable since, assuming the population is stable, the number of women still unscreened reduces each year. This

Fig IX

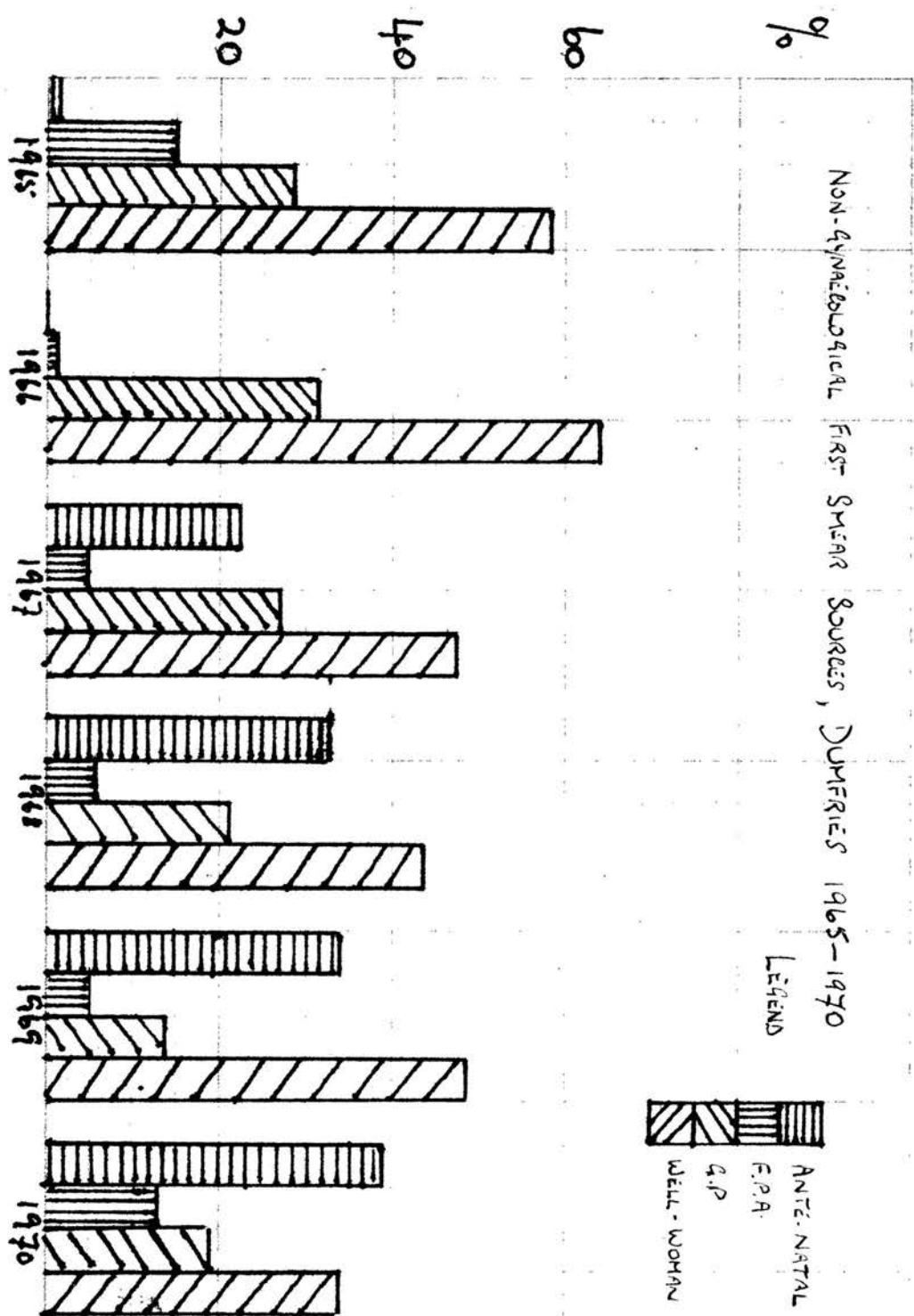


decline will be discussed further in connection with the review of the contribution from Well-woman clinics.

The contribution from each of the non-gynaecological sources is shown in Fig. X. It is seen that as a result of the introduction of routine cervical screening at hospital ante-natal clinics in 1967, the number from this source has steadily risen and represents 21.9 per cent of the total contribution of smears for the whole period under review. The Family Planning clinics in the area were responsible for 6.6 per cent of the total number of smears submitted. The proportion was almost static from 1967 to 1969 but a sudden steep increase is observed in 1970. This may be associated with the "Scare" about the Oestrogen content of oral contraceptives which received much publicity at this time. Many women went to Family Planning clinics to seek advice on the matter and thus would be examined at that time. The smears submitted by general practitioners show a progressive decline after 1966, the third year of availability of the service, until 1970 when a slight increase occurs. This would suggest that general practitioners were more zealous in smear-collection in the early years of the service; unfortunately, details of the practices from which smears were received are available for 1970 only so that one cannot prove this. The rise in 1970 may be associated with the introduction of payment of a slightly increased fee for this service. General practitioners contributed 23 per cent of the total number of smears submitted from 1965 to 1970.

It is observed that the Well-woman clinics are the most important single source of first smears until 1970 when they are

Fig. X



overtaken by the ante-natal clinics. The falling off in attendance after the two years in action is to be expected. The eager and easily persuaded will attend during the early years of a screening programme with the result that one has to rely on recruiting the less-willing and less-interesting women to maintain the rate in the later years. This expected trend in attendance was one of the factors taken into consideration when deciding to recall women every three years. The Well-woman clinics submitted 48.5 per cent of the total smears. The high rate of recruitment to these clinics is a just reward for the immense amount of effort expended by Dr. D. A. Player, M. O. H. of the burgh of Dumfries at that time, and his staff towards establishing the clinics and running them so successfully.

The age-specific sources of first smears submitted to the Pathology laboratory in Dumfries in 1969 and 1970 is shown in Fig XI. Age-specific data is available for these years only but it is likely that the pattern is similar in all years from 1967 onwards.

The importance of the ante-natal clinics in the case of the younger women is very evident. As age increases and the contribution from ante-natal and Family Planning clinics declines, the importance of the general practitioner and the Well-woman clinic increases. The Well-woman clinics are seen to reach their zenith in the 40-49 year-old group and the general practitioner a decade later. The contribution from the gynaecological clinics which, as one would expect, steadily rises with age helps to boost the number of first smears in these older age groups who are notoriously difficult to

AGE SPECIFIC SOURCES OF FIRST CERVICAL SMEARS - DUMFRIES AREA 1969+1970

LEGEND:

B: NON-GYNAC ONLY



ANTE NATAL



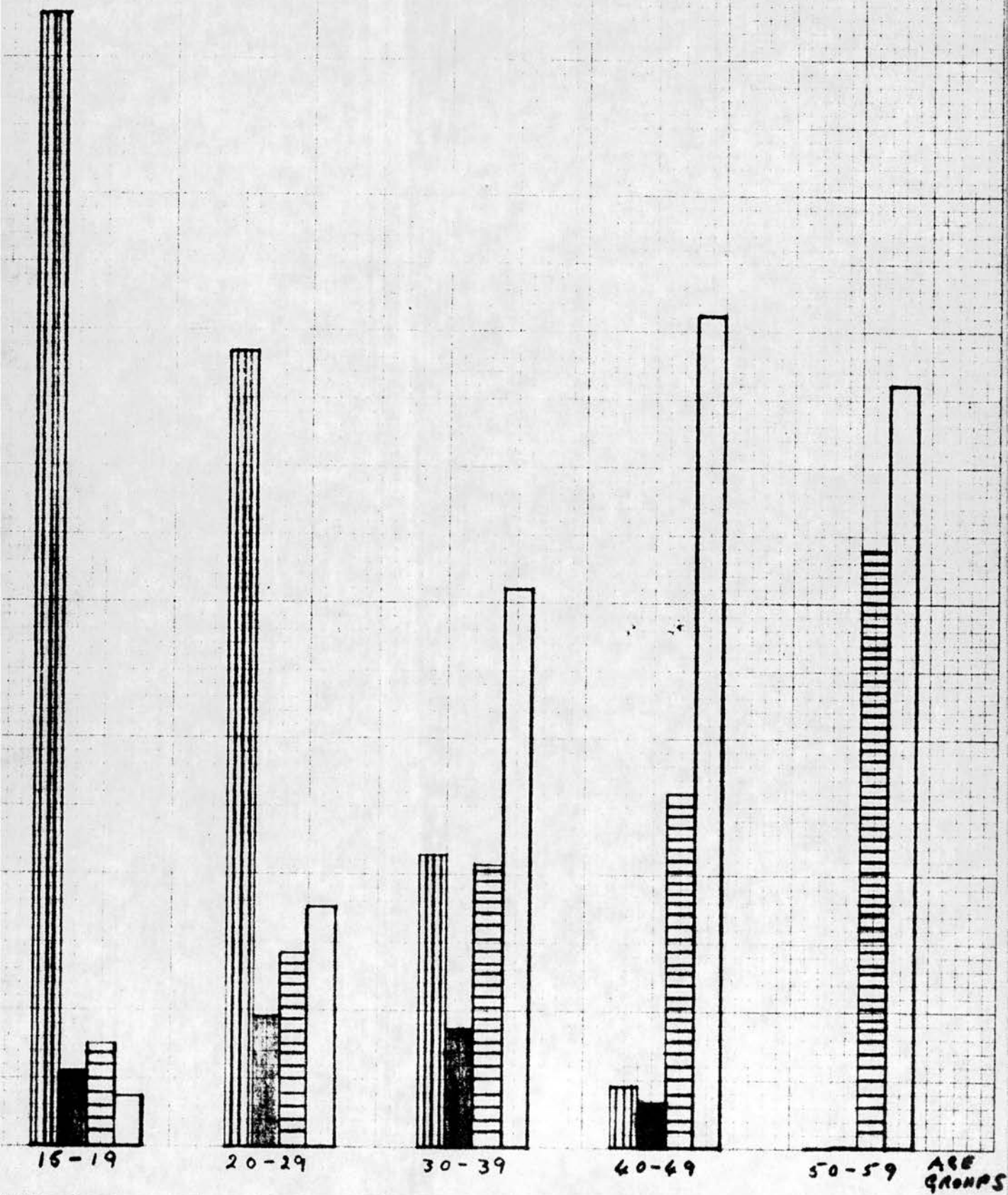
F.P.A.



G.P.



WELL-WOMAN



enlist in a screening programme. The yield of carcinoma-in-situ and invasive cervical cancer from these women justifies every effort required to persuade them to attend a screening clinic.




This study of age-specific sources of smears emphasises the fact that all sources of smears play an important part in achieving satisfactory recruitment.

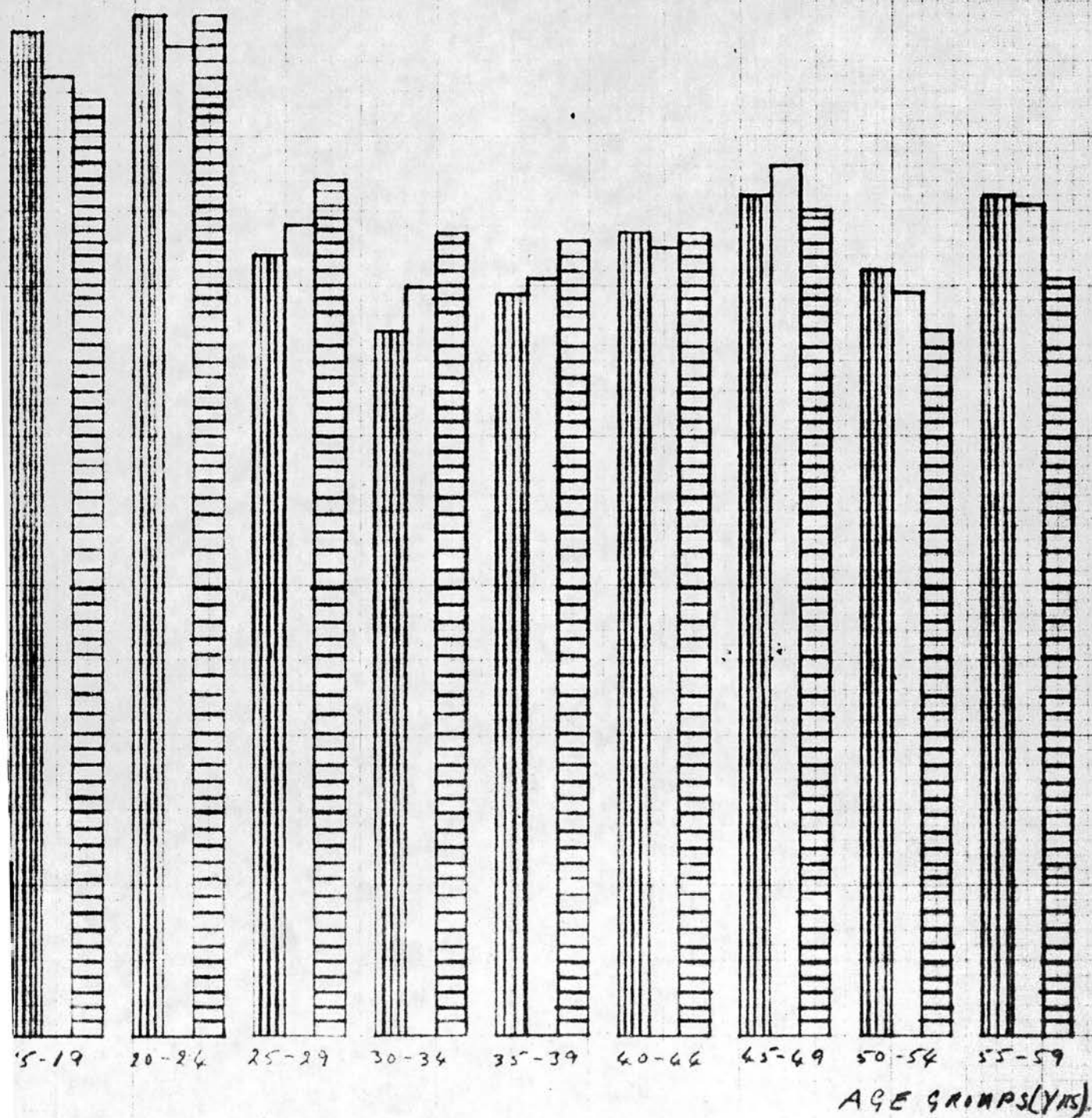
How does the extent of cervical screening in the Dumfries area compare with the situation in Scotland as a whole and with an area more comparable in respect of female population available? The area served by Falkirk Royal Infirmary Pathology laboratory has been selected for this comparison. Data is available for all the years from 1965 onwards. The catchment area and estimated female population aged between 15 and 59 years is approximately 1.7 times that of Dumfries but there is a similarity in the availability of cervical screening in the two areas. Routine screening at ante-natal clinics was -already in operation in Falkirk by 1965 but Well-woman clinics were not established there until 1966, one year later than in Dumfries. General practitioners in both areas were able to submit smears from 1964 onwards. The data on Scotland for 1966 has been interpolated as no breakdown was available in the W. R. H. B. statistics on cervical cytology for that year.

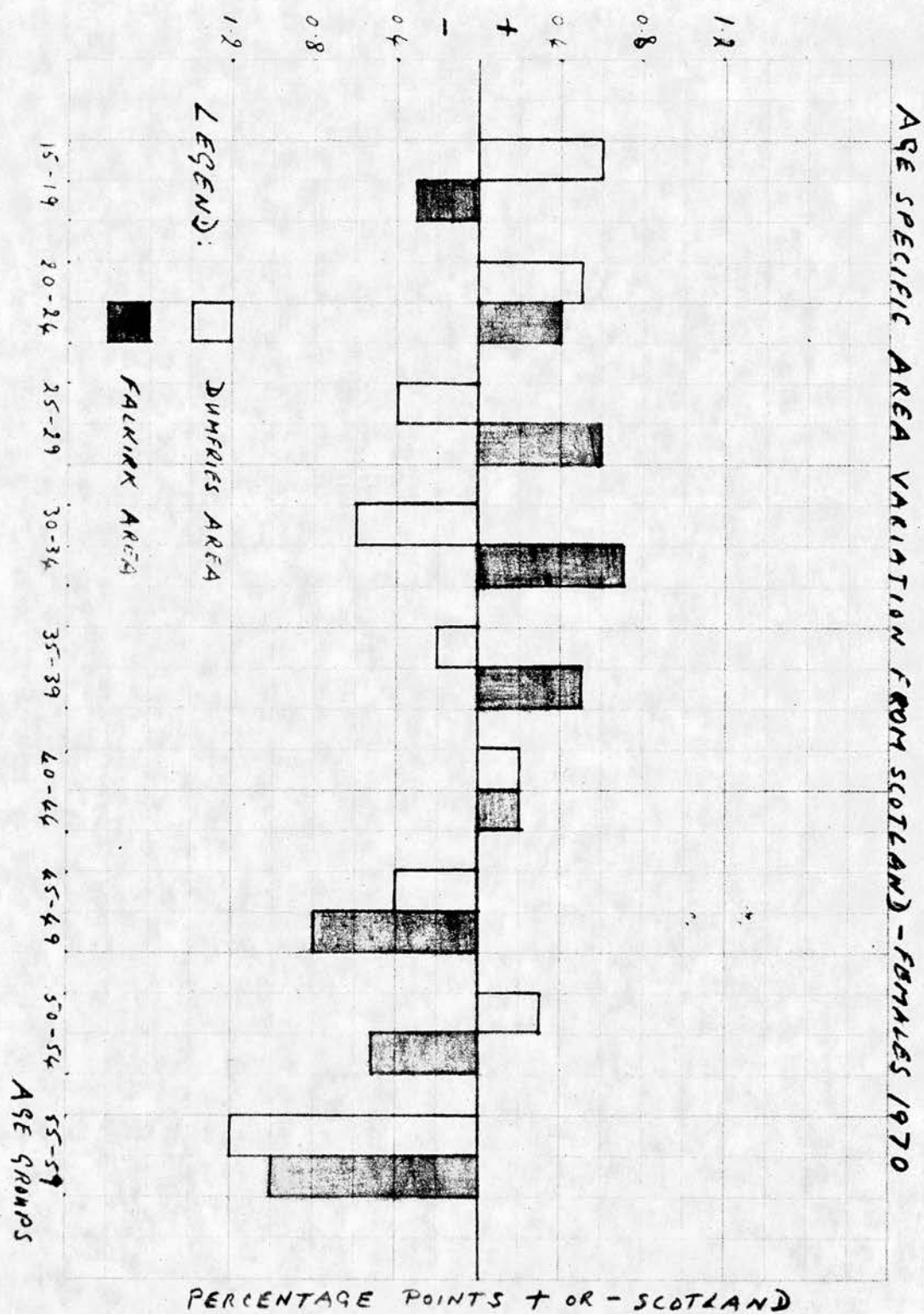
The age-specific structure of the estimated female population aged between 15 and 59 years in Scotland and in the catchment areas of Dumfries and Falkirk Pathology Laboratories is shown in Fig XII. The variation from Scotland in Dumfries and in Falkirk areas is

AGE STRUCTURE OF FEMALE POPULATION AGED 15-59 YEARS

LEGEND:

-  DUMFRIES AREA
-  SCOTLAND
-  FALKIRK AREA





shown in Fig XIII. The Dumfries area is seen to have a slight excess of females in the 15 to 24 years age group and both Dumfries and Falkirk have a deficit of women in the 55 to 59 year old group. The slight variation among the three populations will not affect statistics on cervical screening in the three areas under consideration.

The total number of cervical smear submitted from the three areas from 1965 to 1970 is shown in Table XXX

TABLE XXX

NO. OF FIRST CERVICAL SMEARS, SCOTLAND AND FALKIRK
AND DUMFRIES PATH LAB AREAS 1965-1970

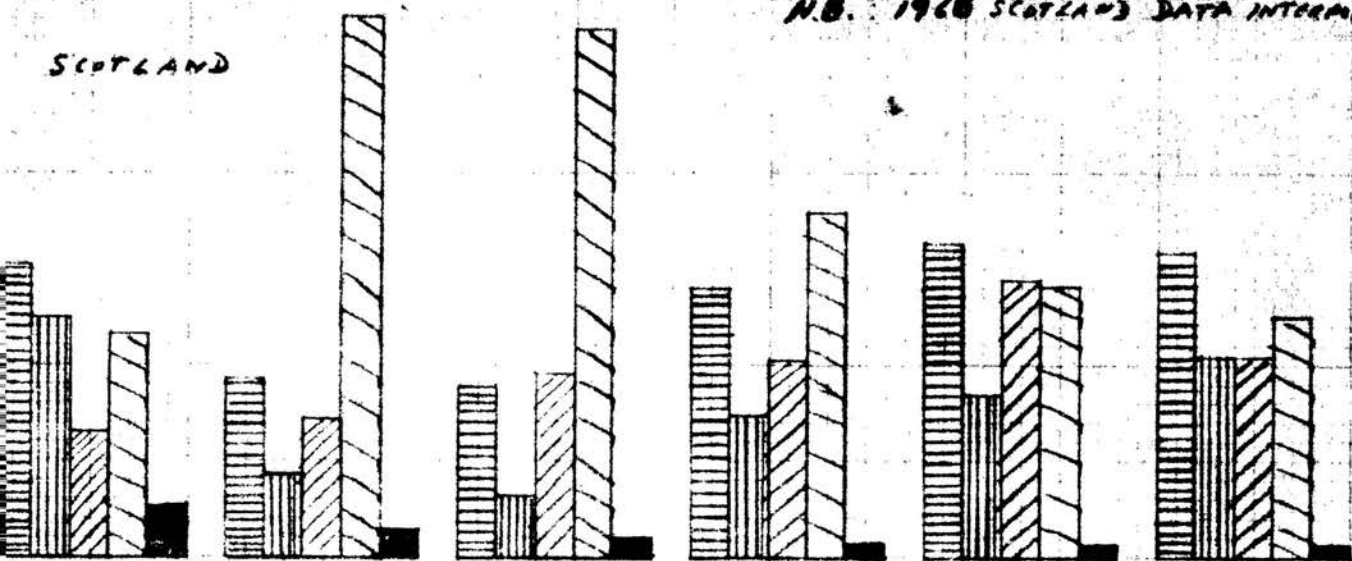
Lab. Area	Source	No. of first smears	Female pop. 15-59 yrs.	% "smeared"
SCOTLAND	Gynae	261,772	1,497,195	18.2
	Non-Gyn	525,872	1,497,195	35.1
	Total	797,644	1,497,195	53.3
FALKIRK	Gynae	9,112	72,000	12.6
	Non-Gyn	28,574	72,000	39.7
	Total	37,686	72,000	52.3
DUMFRIES	Gynae	6,406	40,300	15.9
	Non-Gyn	25,850	40,300	64.1
	Total	32,356	40,300	80.0

It is observed that the proportion of the population who have had at least one cervical smear taken between 1965 and 1970 is almost identical for Scotland and Falkirk area but that a much higher

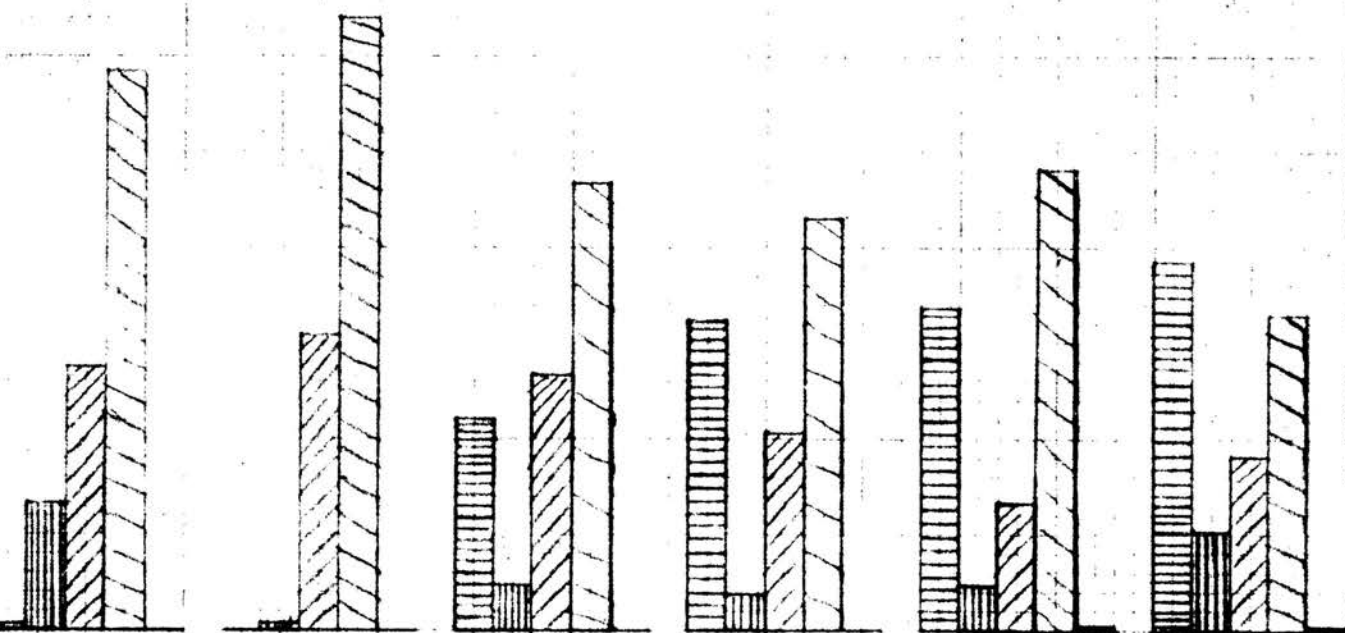
NON-GYNAECOLOGICAL FIRST SPEAR SOURCES FOR FALKIRK, DUMFRIES AREAS & SCOTLAND - 1965-1970

N.B. 1966 SCOTLAND DATA INTERPOLATE

SCOTLAND



DUMFRIES AREA



FALKIRK AREA



LEGEND:

- ANTE-POST NATAL
- FAMILY PLANNING
- G.P.
- WELL-WOMAN
- OTHER

proportion of the population in the Dumfries area has been screened.

The pattern of contribution from the Non-Gynaecological sources in these three areas is shown in Fig XIV.

It is observed that there is considerable variation from year to year in the three areas and that the pattern of the individual contribution from each source differs markedly. The proportion of total first smears submitted from each source in the three areas is shown in Table XXXI

TABLE XXXI

PROPORTION OF TOTAL FIRST SMEARS, 1965-1970 FROM NON-GYNAECOLOGICAL SOURCES, SCOTLAND AND FALKIRK AND DUMFRIES PATH LAB AREAS

Area	Ante-natal Post-natal	F. P.	G. P.	Well-woman Clinics
Scotland	28.3%	15.6%	19.7%	34.5%
Falkirk	28.0%	14.1%	28.9%	26.5%
Dumfries	21.9%	6.6%	23.0%	48.5%

It will be recalled that routine cervical screening did not commence at Ante-natal clinics in the Dumfries area until 1967 so that one could say that the proportion of smears submitted from Obstetrics clinics in the three areas is similar. It is observed that the contribution from the Family Planning clinics in Dumfries is very much less than -that from the other two areas. The proportion of first smears submitted from general practitioners in the three areas shows a different pattern. The general practitioners of the Falkirk

area have made the largest single contribution to the total and emerge just marginally ahead of the Obstetric clinics. The proportion of smears submitted from general practitioners in the Dumfries area is relatively low although it exceeds that for Scotland as a whole. Once again, the virility of the Well-woman clinics in the Dumfries area is reflected in the high proportion of smears submitted from this source. It is seen that the total contribution far exceeds that of the other two areas and that there is an inverse relationship between the performance of general practitioners and Well-woman clinics in Scotland and in Dumfries. It has been observed already that general practitioners in the Dumfries area tend to refer their patients to a local Well-woman clinic in preference to taking the smears themselves and the above figures suggest that this is true of Scotland as a whole. The general practitioners and Well-woman clinics perform in near-equilibrium in Falkirk.

The age-specific proportion of first smears submitted from the non-gynaecological sources in the three areas in 1970 is shown in Fig XV and the proportion screened in relation to the population "at risk" is given in Table XXXII.

It is clear from Table XXXII that activity in cervical screening in 1970 was very similar in total volume of first non-gynaecological smears in relation to population at risk for comparable age groups in the Dumfries and Falkirk Pathology laboratory catchment areas and that this activity was double that for Scotland as a whole. Fig XV showing age-specific variation of these areas with Scotland illustrates

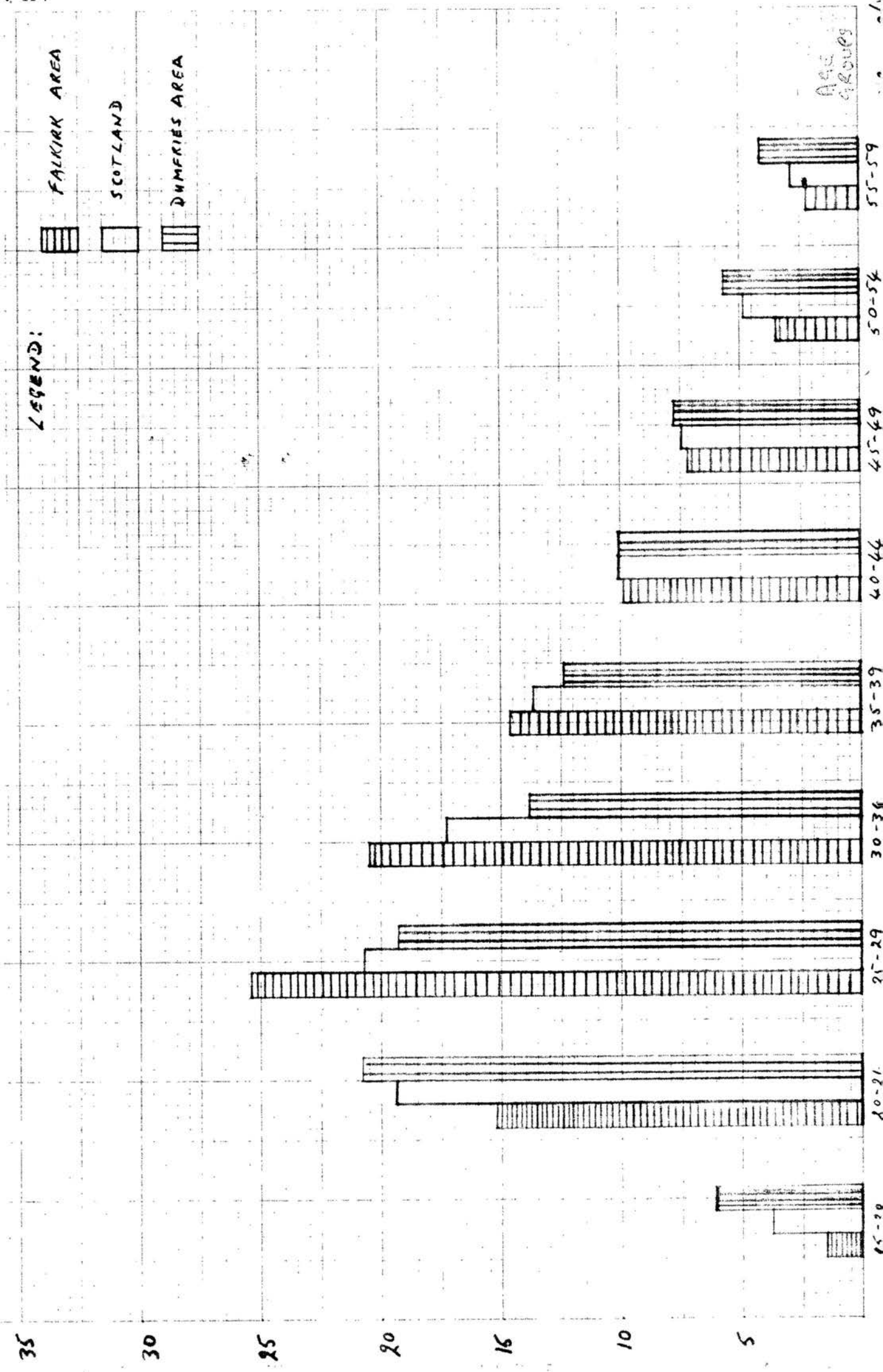


TABLE XXXII

NON-GYNAE, FIRST SMEARS AS PERCENTAGE OF POPULATION "AT RISK", 1970

AGE GROUPS (YRS.)	FALKIRK		DUMFRIES		SCOTLAND	
	Fem. Pop. (%)	No first smears (%)	Fem. Pop. (%)	No first smears (%)	Fem. Pop. (%)	No first smears (%)
15-29	27000 (37.5)	3099 (11.5)	15100 (37.5)	1910 (12.7)	550963 (36.3)	33763 (6.1)
30-59	45000 (62.5)	4265 (9.5)	25200 (62.5)	2230 (8.9)	946227 (63.2)	43378 (4.6)
TOTAL	72000 (100.0)	7364 (10.2)	40300 (100.0)	4140 (10.3)	1497195 (100.0)	77141 (5.2)

TABLE XXXIII

Incidence of Carcinoma-in-Situ, Invasive Squamous Cancer and Adeno-Carcinoma of Cervix, detected by Exfoliative Cytology, Dumfries, Falkirk and W.R.H.B. Path. Labs. Area 1969 and 1970.

Year	Area	Carcinoma-in-Situ		Invasive Sq. Ca.		Adenocarcinoma	
		No. Cases No. Smears	Rate/ 1000	No. Cases No. Smears	Rate/ 1000	No. Cases No. Smears	Rate/ 1000
1969	Dumfries	$\frac{13}{6244}$	2.1	$\frac{4}{6244}$	0.6	$\frac{4}{6244}$	0.6
	Falkirk	$\frac{6}{7343}$	0.8	$\frac{4}{7343}$	0.5	$\frac{3}{7343}$	0.33
	W.R.H.B.	$\frac{146}{90952}$	1.6	$\frac{92}{90952}$	1.0	$\frac{22}{90952}$	0.2
1970	Dumfries	$\frac{19}{6590}$	2.9	$\frac{6}{6590}$	0.9	$\frac{2}{6590}$	0.3
	Falkirk	$\frac{9}{8332}$	1.1	$\frac{4}{8332}$	0.5	$\frac{0}{8332}$	0.0
	W.R.H.B.	$\frac{151}{99366}$	1.5	$\frac{102}{99366}$	1.0	$\frac{19}{99366}$	0.2

the main difference was in the 55-59 age group, but that the two areas were diametrically opposed to each other for the age groups between 25 and 39 years. The explanation for this pattern in Dumfries has already been given; women in the age groups 25 to 39 years are the ones most readily enlisted in a screening programme so that by the beginning of 1970, when 69 per cent of the at risk population had already been screened at least once, fewer first smears would be expected from this age group. Neither in Scotland nor Falkirk, where a total coverage of just over 50 per cent of the population at risk has been achieved, has reached this saturation point.

It is concluded from a study of these three areas that there is already a lot of activity in cervical screening. The proportion of smears from each non-gynaecological source varies from area to area and is directly related to age. It is observed that a coverage of 80 per cent of the population at risk has been achieved in the Dumfries area by 1970 compared with a coverage of just over 50 per cent for the Falkirk area and Scotland as a whole. It is shown that the high coverage in the Dumfries area is largely due to the strength of the Well-woman clinics in this area.

Unfortunately, no information is available of the social status of the women recruited as this is not included in the cytology form used in the W. R. H. B. area.

The incidence of cases detected by Exfoliative Cytology of Carcinoma-in-Situ, Invasive squamous cancer and Adenocarcinoma of the cervix from the Pathology laboratory areas of Dumfries,

Falkirk and W. R. H. B. in 1969 and 1970 is shown in Table XXXIII .

It is seen that there is a higher incidence of Carcinoma-in-situ in both years in the Dumfries area compared with the other areas.

Dr. Scott, the Pathologist at Royal Infirmary, Dumfries considers that this may be partly explained by variation in the interpretation of the lesion of carcinoma-in-situ in the different areas. None of the ten cases of invasive squamous cancer detected in the Dumfries area in 1969 and 1970 occurred in women previously screened.

EPILOGUE

"Seek, and ye shall find"

St. Matthew, chap.vii, v.7

The whole emphasis of the subject of this Thesis is on seeking and the detection of cases of carcinoma-in-situ and invasive cancer of the cervix represents the 'find'. The doubts cast on the ability of cervical screening to eradicate invasive cancer are noted and the elucidation of the natural history of the disease keenly awaited. The case for cervical screening in the light of present knowledge can perhaps be best summed up by quoting the conclusions from a leading article in the B. M. J. (1967) - "It is suggested by some workers that there may be at least two different forms of carcinoma of the cervix; the first progresses slowly to invasion of the underlying tissues through a pre-invasive phase, while the second is rapidly progressive, may not be preceded by carcinoma-in-situ, and (no matter how prompt the diagnosis or radical the treatment) has a relatively bad prognosis. Nevertheless, even if this point of view were correct, the large amount of effort involved in cervical screening could still be justified on two grounds. Firstly, women would benefit from the earlier detection of invasive lesions, and, secondly, doctors would gain a better understanding of the natural history of cervical cancer". Cervical screening is thus given a qualified blessing although one observed that the main objective of screening - the detection of carcinoma-in-situ - is not listed among the reasons for justifying the procedure.

Setting aside the controversy over the ultimate value of screening as a result of over six years' experience of cervical

screening in Practice I would give an unqualified "Yes" in answer to the question "Is the effort worthwhile?" The "Find" of twelve cases of carcinoma-in-situ may be the only positive result of one's effort but other immeasurable indirect benefits have emerged. A new rapport has developed with patients now well-accustomed to regular screening; this has resulted in a greater willingness to disclose and discuss symptoms or fears of gynaecological disease, often minor but none-the-less worrying, much of which can be simply alleviated when it is known. I have found a regular clinic for gynaecological investigation removes the occasional temptation to dodge carrying out a pelvic examination when a patient attends in the course of a busy consulting session. The closer liaison which now exists with the Gynaecologists and with the Pathologist as a result of screening is welcomed.

Some conclusions are drawn from this survey on cervical screening:

Recruitment

It is evident that all agencies presently submitting smears make an important contribution towards the goal of attaining a "screened" population in this country. It is seen that the Obstetric and Family Planning clinics play the leading role in recruitment of women in the 15 to 29 year old groups after which there is a "take-over" by the general practice and Well-woman clinics who are supported, as age increases, by the contribution from the gynaecological clinics. The trend is for a high level of recruitment up to the age of 40 to 45 years of age and thereafter a steady decline although variation in this pattern is observed from year to year and in different locations. The fact that

it is possible to achieve a high level of recruitment, even in discouraging circumstances, has been demonstrated.

All methods of recruitment are seen to be worthwhile. A combination of methods is probably most rewarding and the approach depends to some extent on the type of population being recruited. It has been shown that Mass Media methods attract women in the upper social classes while personal contact is found to be more effective among the lower social groups.

Role of the General Practitioner

It is submitted that the importance of the role of the general practitioner in cervical screening has been well-substantiated. Whether he carries out screening himself, and this must depend on individual inclination and facilities available, or encourages his patients to attend a convenient Well-woman clinic, his role is vital in attempting to achieve as comprehensive a coverage as possible. The whole Practice Team can support him in this role. In a consideration of surveillance in general practice Wilson, (1965) makes the following observations:

1. "Knowledge of how to manage patients with early disease is needed and for this a different education for general practitioners must be provided ... From my own experience of clinical medicine, clinical know-how is at present too much confined to the hospital environment for general practice screening and the management of early disease to be successful". If this is in fact so, then attention to this subject in undergraduate and post-graduate education is obviously of great importance.

2. "It is necessary to have a proper age and sex register of patients in general practice". The possession of such a register is becoming more common and is likely to increase now that partial reimbursement of the cost involved in compiling such a register has been introduced.
3. "Time and place. I cannot imagine that large numbers of general practitioners would feel they had time or proper facilities for routine surveillance of their patients. Certainly, there are some keen ones who are able to carry out cervical cytological examinations, but generally, at present, this is developing as a service where smears are taken at local health authority or other clinics. The results are sent to the general practitioner, who takes the further action necessary. However, any kind of general surveillance would be quite impracticable under present conditions. The only way in which this could be done would be with ancillary help and probably in purpose-built premises".
A lot has taken place in general practice since these words were spoken. The introduction of the "Charter" in 1965 has resulted in widespread employment of ancillary staff and, in many areas, Local Authority nurses are attached to practices. Many doctors are now working in well-equipped group practice premises and there is an ever-growing tendency, in Scotland at any rate, to practice in Health Centres. By August, 1969 in Scotland, 13 Health Centres were already in operation and another 81 in various stages of planning or construction. All

these developments solve many of the difficulties cited above and it will be interesting to see whether an upsurge in the concept of preventive medicine materialises. Better organisation in general practice by, for example, running consultations by appointment, can allow time for other procedures such as screening. Perhaps one should adopt the attitude of Julius Caesar - "I shall find time, Brutus, I shall find time".

Follow-up Examinations

The role of the general practitioner is even more important when one considers follow-up screening. The follow-up of patients attending Family Planning clinics is easily affected as these women are already being seen at regular intervals. The meagre information I have been able to glean about recall to Well-woman clinics suggests that inability to trace women seems to be the main obstacle to a high recall rate. The general practitioner should encounter little difficulty in this respect. He also has an unrivalled opportunity to prevail upon a reluctant patient to attend in the course of attending her or her family. It has been shown how important it is to make every endeavour to recruit women from the lower social classes and in the older age groups and it is among these two that the majority of reluctant or apathetic patients is to be found.

It is hoped that the introduction of a national computer recall system will alter the present position where, apparently, no systematic arrangements are made for recall of patients examined at Obstetric or Gynaecology clinics. A tremendous opportunity is lost if such women are not advised that they have had a smear taken and follow-up organised.

Non-attendance

It is suggested that much can be done in the field of education to lessen the problem of non-attendance. It appears that fear of cancer is the most potent factor in non-attendance although this may not be openly expressed or possibly even appreciated by the patient. Less inhibited discussion of cancer as a disease and correction of the impression that it is nearly always incurable should help to dispel such fears. The more patients there are in the community who are known to have been successfully treated for cancer the more this should be realised. As stated earlier, it is important that doctors as well as the public should become better informed of the concept of screening in presymptomatic disease.

Non-negative smears

The confusion in reporting "positive" results has been noted. It is evident that the general practitioner plays the key role in the case of an abnormal smear report being obtained. No matter where the original smear was taken it is he who has to inform the patient and arrange further investigation if this is not arranged automatically.

It seems at the moment that, as conditions in Practice move towards making screening programmes a practicable possibility, screening in cervical cancer is going through a phase of disillusionment. It is all the more important therefore, that effort should be concentrated on acquiring the evidence essential for the full understanding of the nature of cervical cancer.

REFERENCES

B. M. J., 1., 782.

Wilson, J. M. G., 1966, Surveillance and Early Diagnosis in General Practice, O. H. E.

APPENDIX 1

Examples of Letters and Poster from surveys.

Aberdeen, Macgregor et al.

1st Letter

Dear

You may have heard, or read, of a simple test to detect changes at the neck of the womb which might later develop into cancer.

Arrangements have been made -for you to have this test done by a woman doctor.

Your appointment is on at at the
Clinic.

If this is not suitable please come at the same time one week later.

IF YOU HAVE HAD A SMEAR TAKEN WITHIN THE LAST TWO YEARS, THERE IS NO NEED TO COME, BUT PLEASE LET ME KNOW.

2nd Letter

Dear

It probably was not convenient for you to go and have the test to detect early signs of cancer at the neck of the womb. Another appointment has been made for you to go on at
at the Clinic.

Possibly you explained why you were unable to attend, but if you are still unable to go please return the attached slip.

Yours sincerely,

NAME

ADDRESS

I am UNABLE/UNWILLING to attend because

3rd Letter

Dear

You have received two invitations to attend the surgery to have a cervical smear taken and as you have so far not attended I presume neither of these days were suitable.

A further appointment on at has been arranged for you. Please do your best to come.

Yours sincerely

Spenser, Leight, Lancs

Dear Mrs.

You may have read that more and more women all over the country will be able to take advantage of a simple test which helps to prevent them developing cancer of the womb.

We are now able to offer you this test, which is just like an ordinary internal examination, does not hurt, takes about 5 minutes and will be done by one of us at the surgery. All you need to do is to bring this letter to the surgery during consulting hours and make an appointment with the receptionist.

Yours sincerely,

Rose, Dalbeattie

(Letter sent in October, 1970 to those who remained "unscreened" by that date)

Dear Mrs.

Well-Woman)
Cervical Smear) Clinic, Dalbeattie

It would appear that you have NOT had this simple test - which is designed to prevent cancer of the neck of the womb - performed. As it is so very much to your advantage to have this test done I am sending you a provisional appointment - see below - BUT, IF THIS IS NOT SUITABLE, PLEASE TELEPHONE DALBEATTIE, 331 and A SUITABLE ALTERNATIVE APPOINTMENT WILL BE GIVEN. The clinic is held on most Wednesday afternoons but appointments can be arranged for a Monday or Thursday evening or Saturday morning.

APPOINTMENT

DAY	DATE	TIME
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Yours sincerely,

Example of POSTER

Cullinan and Montgomery, Ashford

Two thousand five hundred women die every year in Great Britain from cancer of the neck of the womb. Yet this disease is now almost totally preventable by a quick, simple, painless test repeated at two- to three-year intervals. We are now in a position to offer this test free to all our female patients, and you are most earnestly advised to think about this. Please ask the doctor for more information.